

FLIGHT

The
AIRCRAFT ENGINEER
AND AIRSHIPS

First Aeronautical Weekly in the World. Founded January, 1909

Founder and Editor: STANLEY SPOONER

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DIARY OF CURRENT AND FORTHCOMING EVENTS

Club Secretaries and others desirous of announcing the dates of important fixtures are invited to send particulars for inclusion in this list:—

1931

Dec. 18. Air League Dinner to Sqdn.-Ldr. Bert Hinkler, at Dorchester Hotel.
Dec. 19. College of Aeronautical Engineering Annual Dinner and Dance, Park Lane Hotel.

1932

Jan. 14. "Interference," Lecture by E. Ower, before R.Ae.S.
Jan. 15. D.H. Technical School Dance at Portman Rooms, W.
Jan. 28. "Effect of Height on Range," Lecture by A. E. Woodward-Nutt and Flt.-Lt. A. F. C. Scroggs, before R.Ae.S.
Feb. 13. Rugby: R.N. v. R.A.F., at Twickenham.
Feb. 24. "A Flight to Abyssinia," Lecture by Sqdn.-Ldr. J. L. Vachell, before R.U.S.I.
Mar. 4. Leicestershire A.C. Annual Ball.
Mar. 10. "Results with the New Wind Tunnel at N.P.L.," Lecture by E. F. Relf, before R.Ae.S.
Mar. 16. "Development of Naval Air Work," Lecture by Commodore N. F. Laurence, before R.U.S.I.
Mar. 23. "High-Speed Flying," Lecture by Sqdn.-Ldr. A. H. Orlebar, before R.U.S.I.
Mar. 26. Rugby: Army v. R.A.F., at Twickenham.
Apr. 13. "The North-West Frontier of India," Lecture by Maj.-Gen. S. F. Muspratt, before R.U.S.I.
June 25. R.A.F. Display, Hendon.

CHRISTMAS HOLIDAYS.

Owing to the holidays "FLIGHT" must close for Press for the issue of December 25 on December 21. All communications and copy, therefore, must arrive at this office not later than the morning of December 18.

EDITORIAL COMMENT



NE would like to know what Dr. Hugo Eckener thinks in his heart of hearts about R 100 as an airship design. Would he, if he had been given the chance, have been willing to buy her, say, at the price which she fetched as scrap duralumin? Was he, we wonder, given that chance? When the Under-Secretary for Air was questioned in the Commons about the steps taken to dispose of the late airship to foreign nations, he replied that he must have notice of the question. Did the Under-Secretary not know whether any such steps had been taken, or were there reasons which made him unwilling to reply without consultation with his advisers?

Once upon a time a translation of Dumas' book "Monte Cristo" was popular reading among British schoolboys and others. We seem to remember an incident in the book to the effect that the opulent Count wanted a dumb slave. He heard of a convict who was condemned to have his tongue cut out one day and to be further mutilated on subsequent days. So the Count waited until the first part of the sentence had been carried out, and then purchased the man, whose gratitude made him a most faithful servant. It sometimes occurred, even to the schoolboy, that the man's gratitude might have been even greater if he had been bought one day earlier.

It rather looks as if Dr. Eckener has been playing the part of the Count of Monte Cristo. No sooner had the axes and saws destroyed all chance of R100 ever taking the air again than the representative of the Zeppelin company opened negotiations for acquiring the use of the airship sheds at Howden and Cardington with a view to using them for the construction of German airships with which to start a commercial service across the Atlantic. It seems, on

the face of it, an excellent scheme for the Zeppelin company. That company remains a firm believer in the value of commercial airships, and certainly the history of the airship *Graf Zeppelin* gives good ground for believing in their technical efficiency. That airship is admittedly not of an ideal design. Dr. Eckener knew—or at least he has been reported as expressing the view—that the fineness ratio of the *Graf Zeppelin* was not so efficient as that of the two British airships ; but at the time when the German ship was laid down he had to cut his coat according to his cloth. The only available construction shed at Friedrichshafen was not high enough to permit of a greater diameter being given to the *Graf Zeppelin*. Despite this shortcoming, the ship has done everything which she has been asked to do. Since she commenced her amazingly successful career, we understand that the construction shed at Friedrichshafen has been enlarged, and that the new Zeppelin now under construction is being given a shape more on the lines of R100. That should give her a better proportion of pay-load. One airship, however, of correct lines is not sufficient for the start of an Atlantic service. Another may be built in the United States, but even two will not make a commercial fleet. More shed accommodation is needed, and these large sheds are very costly structures.

At this moment Great Britain decides to go out of the airship business, and, with some precipitation, breaks up her one airship. She gives the impression that she is prepared to dispose of anything connected with airships for the proverbial old song. The two sheds at Cardington are to stand empty, and the care and maintenance of the station is to cost Great Britain the sum of £4,000 per annum. To have kept the frame of R100 would have raised that sum to £5,000 per annum. The saving of this expenditure will not take one farthing off the British income tax, but when John Bull is seized with a fury of economy he is a very furious Bull indeed. Dr. Eckener wastes no time. He only delays until R100 has been made unrepairable, and then opens negotiations for getting the use of the sheds. He strikes while the economy mood of John Bull is still hot. Doubtless he hopes to get the sheds very cheap ; and we can hardly refrain from wishing him good luck. While R100 was a ship in potential being, we had something to make the basis of a bargain. Now we have nothing. If we can save £4,000 per annum, get some trifle as rent, and perhaps provide employment to a number of the unfortunates at Cardington and Howden who have been thrown out of work, we may well feel that we have done pretty well out of a pretty bad position.

If the deal is brought off, and the construction of a new airship is undertaken at Cardington in the near future, the position will not be without its Gilbertian elements. To break up one airship which has proved itself a pretty useful aircraft, and immediately to start building another in the same shed, may well cause sardonic laughter in the halls of Aeolus. It should afford a useful lesson to John Bull about the dangers of precipitation in economy. Such a lesson would apply to other things besides airships. There are not a few people who believe that airships will never be of any use for anything, and who would cut any loss just in order to get rid of them out of the skies. Their case has not been proved, any more than the

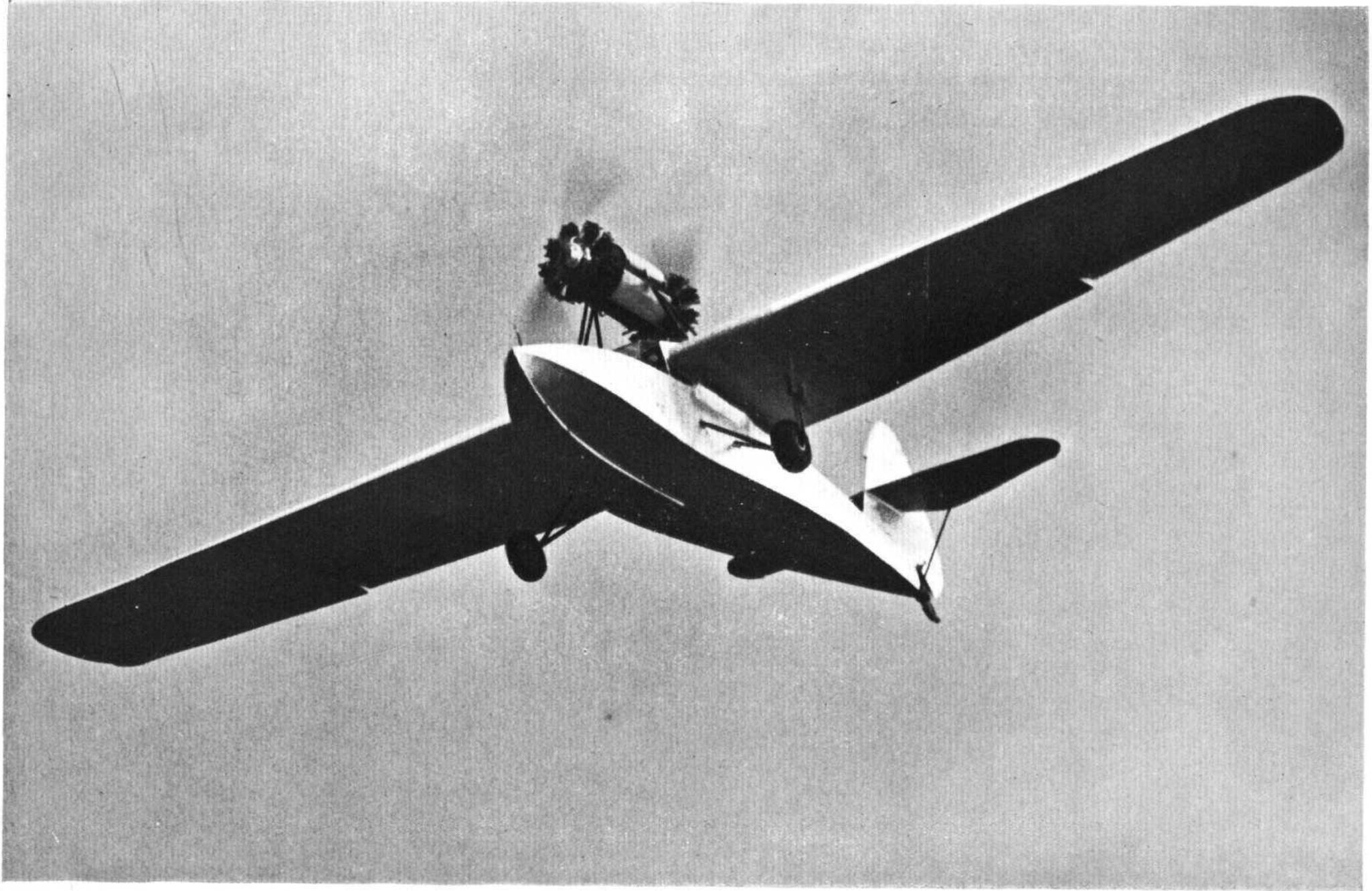
commercial possibilities of airships have been proved. Even supposing that their case will ultimately be proved to be correct, the fact remains that recklessness in national economy may easily lead to national loss.

After the Armistice there was an economy campaign in Great Britain, which in general principles was well justified, but which led in some details to national extravagance. Airships suffered under that campaign, and so did aeroplanes to a lesser extent. The same danger exists at the present moment. Last week we alluded to the possibility that, under the economy campaign, the demand for a mail aeroplane may be postponed. That, if it comes to pass, would be a step which we should regard as the reverse of economical. It might keep a small sum of money in the Exchequer for a short time, but would certainly cost the nation a still greater sum in the long run. And we must not forget that still, every now and again, some interested party raises the cry that it is extravagant for us to maintain a separate Air Ministry and a separate Air Force. Possibly (but not certainly) money might be saved by the abolition of the Ministry and the Force, but from every point of view such saving would be an extravagance and probably a disastrous extravagance. We all know full well that the country is in financial straits (our income tax demand papers have brought that fact home to each one of us), and FLIGHT would be the last to call for any expenditure which can be avoided without doing more harm than good.

Recklessness in economy, however, is to be deprecated almost as much as recklessness in expenditure. If a ship is actually in imminent danger of foundering, cargo must be jettisoned without regard to its character. But if the case is not quite so desperate, if there are prospects of the ship reaching harbour and making future voyages, then great care and discrimination should be exercised in the selection of the cargo which is thrown overboard. In the matter of airships we certainly seem to have been precipitate, and it behoves us to learn by the lesson.

From that there arises another point. The Government has not condemned airships in principle ; it has only decided that at present we cannot afford to pursue experiments. With that decision we have not quarrelled. We are prepared to observe the progress of the German and American experiments in the meantime. If those experiments give grounds for us to resume active airship work when better times return, either with a view to commercial operation across the Atlantic or for the provision of scouts for the fleet, we need to have our hands free to do as seems best to ourselves. We have often pointed out that airships may prove a great economy if used by the Navy for patrolling the trade routes in the Indian and Pacific oceans, and their speed, endurance, and long range of vision may be assets of more importance than the actual saving in money. If the Government comes to an arrangement with the Zeppelin company by which German commercial airships are to be built in our sheds and to use our airship stations, it behoves the Government to see that the terms of the contract will not prevent us from resuming the use of those sheds and stations ourselves if we should decide that it is expedient for us to do so.

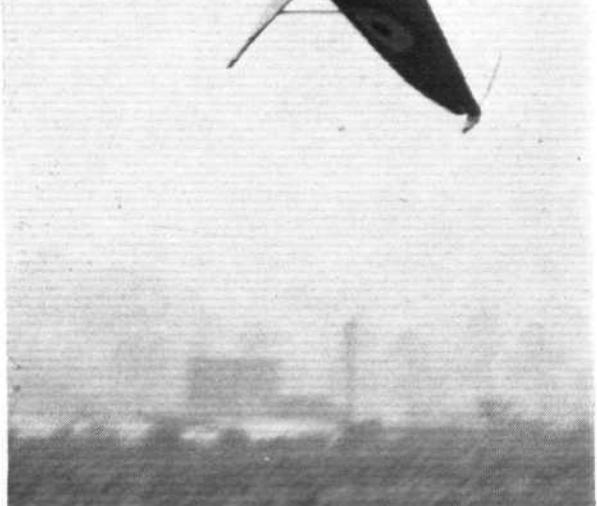




THE HINKLER "IBIS": This is the first photograph of this machine in flight to be published. It is fitted with Salmson AD 9 engines in tandem, and the view from the cockpit is quite exceptionally good. Mr. Hinkler is now seeking capital to develop the type. (FLIGHT Photo.)



Pterodactyl

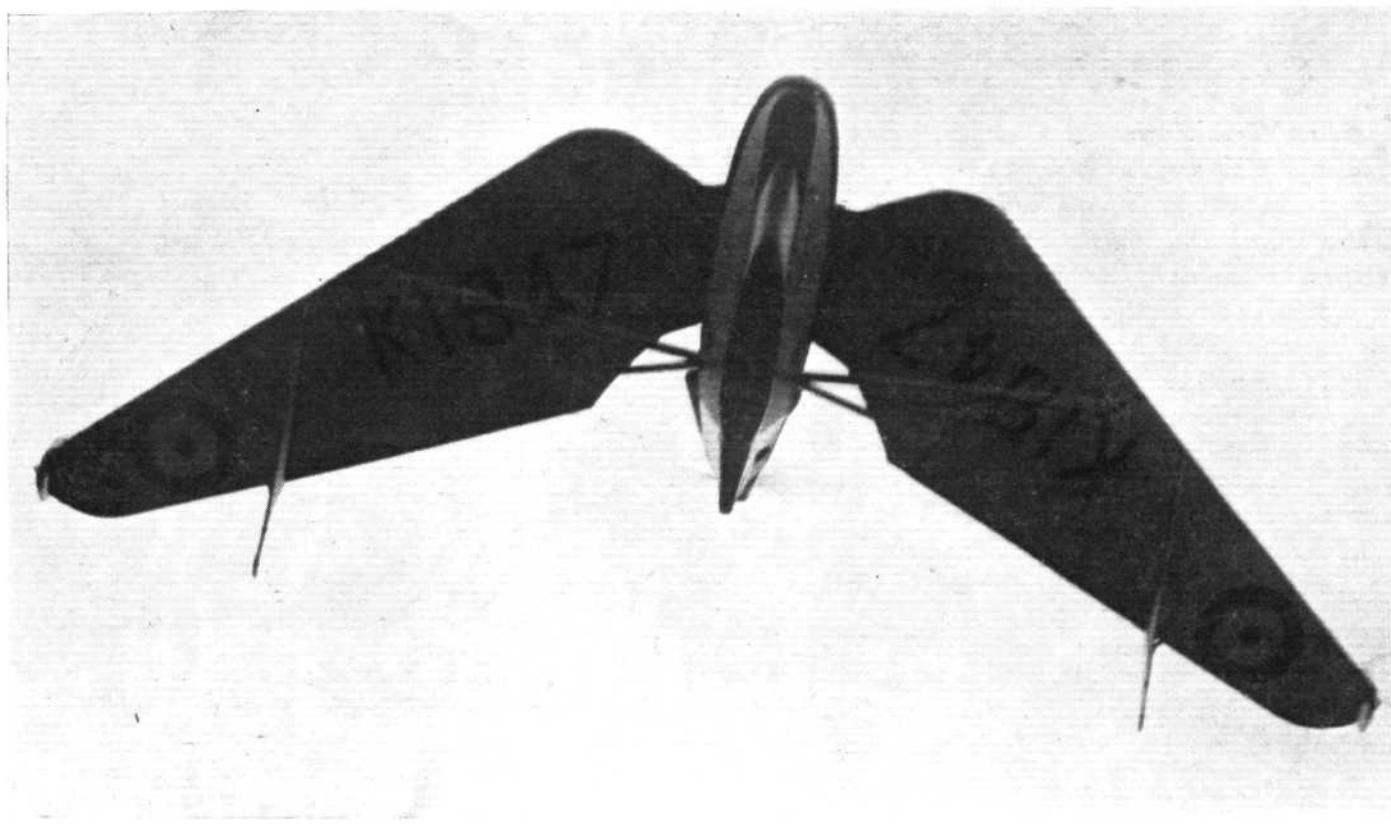


(FLIGHT Photos.)

THE quest for safety in the air goes on. Broadly speaking, there are, as we have previously pointed out, three ways of avoiding the spin following a stall—the "tail-first," the Cierva Autogiro, and the "tail-less" aeroplane. (We are not here concerned with such spin-preventers as Handley Page slots on normal aircraft.) We have recently dealt with the Focke-Wulf "Ente" tailless machine and with the new Autogiros. This week we give a selection of photographs of the Westland-Hill "Pterodactyl," which made its first public appearance at the last Royal Air Force display at Hendon.

The "Pterodactyl" shown in the pictures is

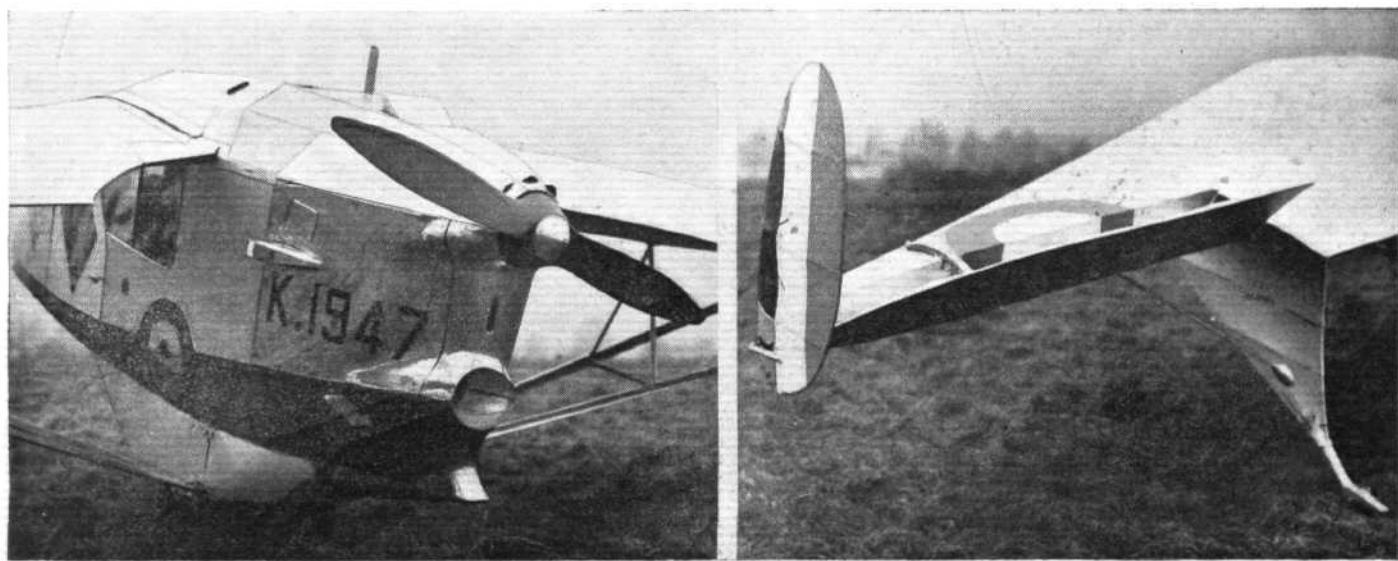
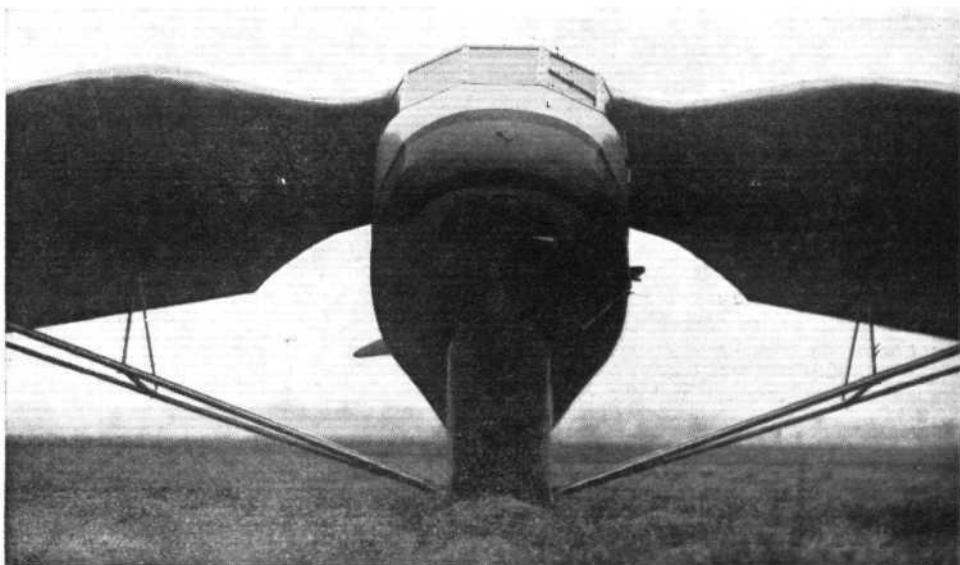




fitted with an inverted Gipsy III engine, which drives a pusher airscrew. The exhaust is taken out through the large opening in the stern, a gauze being fitted to prevent soot, etc., from getting on to the propeller blades.

Piloted by Mr. Brunton, the "Pterodactyl" has now been stunted considerably, one of the evolutions being a number of loops, all performed in a perfectly normal manner. The machine was originally designed for its non-stalling and non-spinning qualities, and the present version is a civil machine, but it would appear that the tailless feature might be very useful in a two-seater fighter if the engine were put in front and a gunner at the back.

In the pictures the "Pterodactyl" is piloted by Mr. Penrose.



The Monospar Wing Flies

The first Test Flights of the Monospar Wing designed by Mr. Stieger and built by the Gloster Aircraft Co., Ltd., for the Air Ministry made its first flights at Brockworth recently. Tests are proceeding but so far the wing seems to come up to expectations

THE wing designed by the Monospar Wing Company and built by the Gloster Aircraft Co., Ltd., for the Air Ministry, has now passed its first flight tests, which, as far as they went, were entirely successful. Piloted by Mr. Schofield, the machine took off very well indeed from Brockworth, its climb and speed both seemed good, and Schofield, in the words of an onlooker, "banged the machine about" considerably once he had convinced himself that the controls were working satisfactorily. Extensive tests are, of course, to be made, and until the results of them are available it would be idle to speculate on the "goodness" or otherwise of the new wing.

What is quite definite already is that the wing has flown, it has been weighed, and it has been approved for strength by Farnborough. The area of the wing is 630 sq. ft., the span 64 ft., and the weight, complete with doped covering, static aileron balances, fittings for engine mountings, wing-tip wireless masts, pitot head and tubing, navigation light brackets, electric wiring and bonding, and wing-tip flare brackets, is 770 lb., or 1.143 lb./sq. ft. Petrol-tank mountings add another 20 lb., bringing the total weight up to 790 lb.

It is interesting to learn that, apart from the saving in wing weight as compared with the standard Fokker wing, no less than 40 lb. was saved on wing engine mountings. This was not due to any deliberate attempt to cut down engine mounting weight. The mountings were, in fact, copies of the original Fokker engine mountings, but by attaching them to one spar and avoiding the picking up of fastenings on a rear spar this weight was saved. Incidentally, the saving in weight on the mountings corresponds to approximately 30 per cent.

The Monospar Company holds the view that still further weight reductions will be possible in subsequent wings of this type. It will be realised that in designing a wing for the Fokker machine, the same points of attachment on the fuselage had to be used. To do this a special wing-to-fuselage adaptor bracket had to be designed. This weighed 44 lb. If the fuselage were designed for the monospar wing, there would still be four points of attachment, but



TAPER: The Monospar wing on the Fokker F.VII-3M has its tips more pointed than the standard Fokker wing. The engines are Armstrong-Siddeley "Lynx."

the second two would be the apices of the pyramid bracing.

It may, perhaps, be recollected that the original estimated weight of the wing was 820 lb., so that the wing has actually turned out 30 lb. lighter than estimated, a somewhat unusual happening for a first attempt. The designers have achieved this weight reduction purely by the merits of the monospar system, and not by the use of any special freak materials such as very light alloys. The wing is in fact constructed entirely of ordinary duralumin for the spar and ribs and steel for the fittings. It is thought quite probable that by using high-tensile steel strip for the spar a further saving could be made.

The Fokker F.VII-3M., which is the property of the Air Ministry and has been used extensively for wireless experimental work, will now be thoroughly tested in flight, the tests to include such items as measured performance tests, high-velocity diving tests, etc. It seems to have been already established, thanks largely to the accuracy with which the strength of a monospar wing can be calculated, that the wing is strong enough in all ordinary flying. The effects of heavy momentary loading during manœuvres, the degree of deflection, and the effects (if any) which such deflections may have on control, have still to be determined. Not until then is it possible to express any considered opinion of the value of Mr. Stieger's invention, but at any rate the first step has been very promising.

It is sometimes said that as light a wing could be built with a different form of construction. We think that quite possibly this is true. But the few and relatively robust parts in a monospar wing seem to promise simplicity and cheap construction. We understand that Mr. Fokker is watching developments with considerable interest.



MONOSPAR WING ON FOKKER F.VII-3M: Front view. Note the great wing thickness in the centre (18 per cent of chord).

Private Flying and Club News

AN INTERESTING Lecture at Hanworth.—On Sunday evening, December 13, Mrs. Victor Bruce held fast the attention of a large audience for some two hours while she lectured on the wonderful flight she made, not long ago, completely encircling the globe (with the exception of the Atlantic and Pacific Oceans) in her "Bluebird." Mrs. Victor Bruce is one of the most fluent lecturers imaginable, and, in fact, so fluent is she that it is difficult to discern a difference when she is lecturing or when she is merely talking to one or two people in her usual way. The lecture was illustrated with a large number of extremely interesting lantern slides and also two cinematograph films taken during Mrs. Bruce's flight over and her landing at Japan, the lantern being operated by her husband, the Hon. Victor Bruce. Even now her flight has never had adequate recognition by the Press, for it stands out as one of the most stupendous exhibitions of determination shown by any pilot, man or female, in recent years.

Mrs. Bruce tells her story in an admirable manner in her recently published book "The Bluebird's Flight,"* which, by the way, would make an excellent Christmas present for anyone, young or old; but for some obscure reason this, though by far the most meritorious of all the exploits of this rather amazing woman, had hardly any publicity worthy of the name.

Col. the Master of Sempill presided at the lecture, and at the conclusion asked the assembly to show to Mrs. Bruce their appreciation in the usual way. His request was hardly needed, for before he had time to sit down their enthusiasm was already audible half-way across the aerodrome.

A LIGHT FLYING BOAT FOR AEROPLANE CLUBS.—In an interview with our Irish correspondent, Capt. J. P. Saul, navigator to Kingsford Smith on last year's trans-Atlantic flight, has given details of a new flying-boat designed by Col. J. C. Fitzmaurice, another Irish Atlantic flyer, whom he met while on a recent trip to the United States.

The flying-boat, which is shown in the accompanying illustration, is designed as a two-seater for use by flying clubs, and Col. Fitzmaurice has endeavoured, as far as possible, to build the machine of component parts which can be easily and cheaply obtained. It is of the monoplane type with a somewhat-high aspect ratio, stability on the water being maintained by the use of stub planes. Twin water-cooled engines of 45 h.p., designed by Mr. William Harbur, who is noted in America for the design of light internal combustion engines, are fitted, and these are faired into the leading edge of the wing. The hull, streamlined fore and aft, provides accommodation for pilot and

passenger in open cockpits. The flying boat is designed for a cruising speed of from 90 to 95 m.p.h., and the estimated cost of production is £250.

It is understood that the machine had not undergone her trials at Port Washington, U.S.A., where she has been built, at the time of Capt. Saul's departure for home, but as Col. Fitzmaurice is expected to visit Europe in the near future to complete details for a second Atlantic flight and trade tour in a Sikorsky S.38 with Capt. Saul, we shall probably have full details of the performance of this interesting little machine before long.

BROOKLANDS WEEKLY NOTES.—The total flying hours for the week ending December 12 have amounted to 25, which include one first solo by Mr. R. Richards. Mr. Hugh Sparks qualified for his "A" licence and Mr. A. Franklyn accomplished his night flying from Croydon to Penshurst for his "B" licence tests.

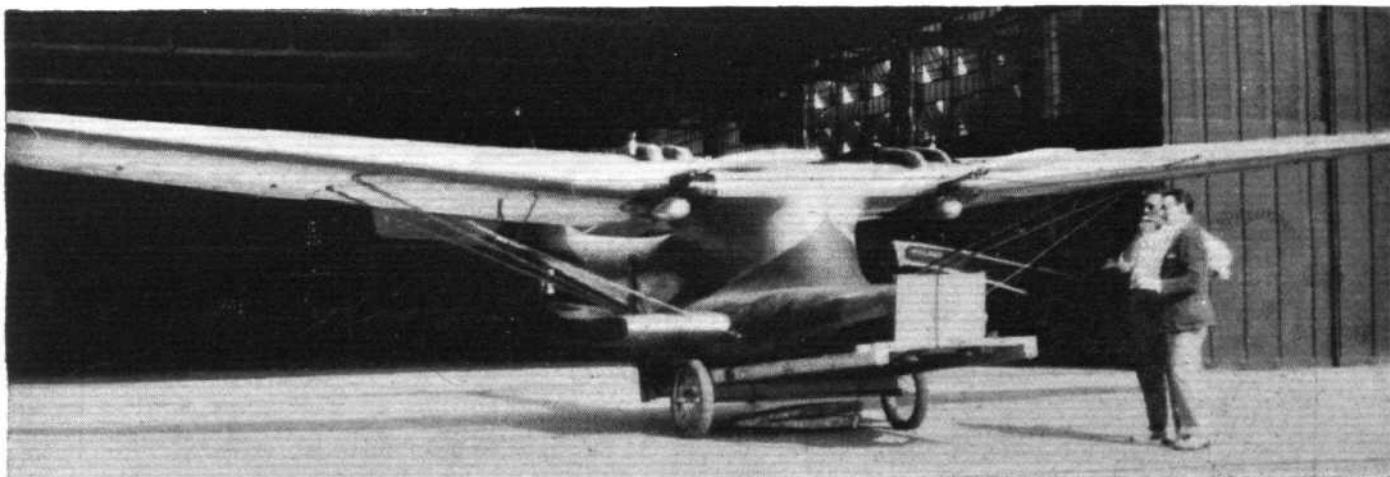
Probably for the first time in the history of civil aviation an aeroplane has been stolen from an aerodrome by a man who has never flown solo. He landed safely at Tidworth about 70 miles from Brooklands.

The culprit had, a matter of two years ago, worked for this School as a ground engineer, in return for which he was given half-an-hour a week instruction in flying. In all, he received about five hours' flying instruction. He left the School and joined the Army as a trooper, and, as far as we know, has not flown for nearly two years.

On Friday he was seen on the aerodrome during the luncheon hour. No notice was taken of him, as he often came here whilst on leave from his Regiment. On the return of the staff after lunch the Aero Club machine was missing, nothing being heard until a 'phone message from the culprit to the effect that he had landed safely at Tidworth was received, saying he had forced landed owing to lack of petrol, and could some be sent him!

FLYING AT BRISTOL.—*Wessex Airways*, that little publication which is the official journal of the Bristol and Wessex Aeroplane Club, have a very sound leader this week, in which they endorse the finding of the Leicester Chamber of Commerce that the establishment of a light aeroplane club was essential to the success of the municipal airport. This has long been the view of National Flying Services, who have invariably established a club at any of the municipal airports with which they have had to deal. Bristol, of course, is in the same position, and find that the club not only entices flying people to come to the aerodrome, but also by means of recreations such as squash rackets and tennis upon social functions induces many other visitors to take an interest in the airport than would otherwise do so. This is a form of propaganda which undoubtedly creates a demand, not only for club instruction, but also for air taxi work, therefore

* Obtainable from "FLIGHT" Office price 21s. 9d. post free.



THE LATEST IN FLYING BOATS: An interesting twin-engined flying-boat designed by Col. J. C. Fitzmaurice—the Irish Atlantic flyer—referred to on this page by our Irish correspondent.

flights and ultimately travel by our major air lines. Furthermore, all these people who are brought in to become interested in aviation directly affect the whole trade, for every airport has a large number of agents not only of aircraft but many other ancillary commodities, and the large number there are of such agents doing good business on an airport so much more prosperous will that airport be. Among the latest innovations at Bristol is the equipment of one of their "Moths" for blind flying. The club will be closed for the Christmas holidays on December 24, 25 and 26. There will be no flying on these days, and the squash racket court will not be available for use. The airport will remain open for visiting pilots and air traffic every day, including Christmas Day. Everyone interested should note that the new telephone

number of the airport is Bristol 25144. The attendance of the evening lectures which have been arranged every Thursday at 7 p.m. has been somewhat disappointing, and it is hoped that members will in future avail themselves of this opportunity to increase their knowledge of so many subjects of value, to pilots particularly so, as there is no charge for these lectures. They will be starting again on January 7, when Flt. Lt. R. Hall will lecture on air pilotage. The taxi service of Phillips & Powis has been doing fairly well and there is quite a lot of work in hand in Airworks' shop. Lady Apsley's machine, which has just been finished in a colour scheme similar to the "Red Star," looks very beautiful. The paint and dope used for this machine, by the way, were supplied by the local firm of John Hall & Sons, Ltd.

Gliding

THE IMPERIAL COLLEGE GLIDING CLUB.—The following Lectures will be held jointly with the British Gliding Association, in Room 15, at The City and Guilds (Eng.) College, Exhibition Road, South Kensington, at 6 p.m.:—

Thursday, January 28.—Mr. C. H. Barnes, "Indoor Flying Models." Chairman, Professor F. T. Hill. (Joint Lecture with T.M.A.C.)

Wednesday, February 10.—Capt. F. Entwistle, B.Sc., "Some Aspects of Meteorology in Connection with Gliding and Soaring Flight." Chairman, Col. H. T. Tizard, C.B. (Joint Lecture with City and Guilds Engineering Soc.)

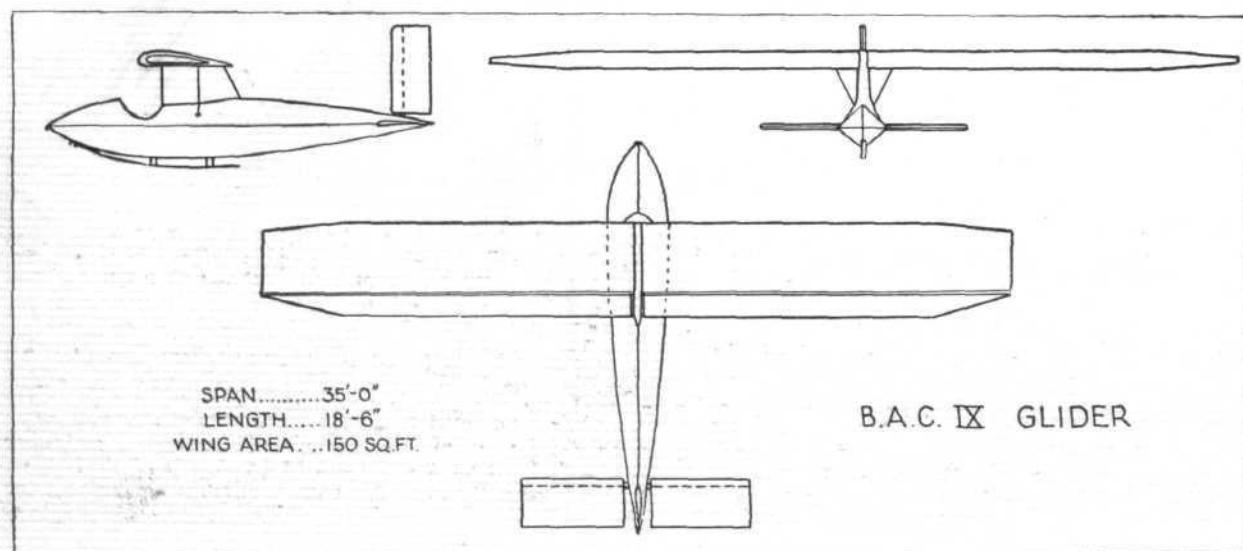
Monday, February 29.—Mr. C. H. Jackson, "Flying Boats on Commercial Air Routes." Chairman, Capt. G. T. R. Hill.

Visitors will be welcome.

THE B.A.C. IX.—This efficient sailplane has recently been designed and marketed by the B.A.C. Co., Ltd., of Maidstone, in such a form that all parts may be bought separately and assembled by club members, who thereby are enabled to obtain an efficient sailplane at a minimum cost. As will be seen from the drawing, this is a high-wing cantilever monoplane of exceptionally clean design, and, in order to facilitate manufacture and transport, the wing is constructed in halves which are joined together by three pins. The elevator and rudder are interchangeable, and, so as to avoid the extreme sensitivity usually associated with an elevator formed in one piece without a preceding

fixed tailplane, the control is arranged differentially, thus allowing a comparatively large travel of the control column at the start, with a correspondingly small movement of the elevator. The ailerons, which run the whole length of each wing, are operated by push-and-pull tubes projecting through the sides of the fuselage. To cater for clubs whose financial resources may be slender, gradual payments can be obtained. At the present time the complete set of parts costs approximately £35 10s. If desired, this machine may also be obtained with a quick-release adjustment and an auto-towing chassis.

LONDON GLIDING.—The London Gliding Club have continued to put in a large amount of work, and during the last week-end several more members successfully flew the tests for their "B" and "C" licences. Among the former were Messrs. Hedges, Smith, Desoutter and Grimstone, while among the latter were Messrs. Humphries, Hiscox and Lee, all of whom were *ab initio* pilots, a fact which is particularly gratifying to the instructors of the London Club, for it is through the training of glider pilots who have had no previous air experience that the utility of the gliding movement is really established. The London Gliding Club is a particularly go-ahead one, and now has at least five different types of machines in the air every week-end. One of the latest of these, the Kassel 20, owned by Mr. D. F. Dent, was soared several times in a masterly fashion by that old hand, Mr. Marcus Manton. The new clubhouse and other buildings are progressing favourably, thanks to the extraordinarily good work put in by the members, all of whom lend a hand in decorating.



General arrangement drawings of the B.A.C. IX glider.

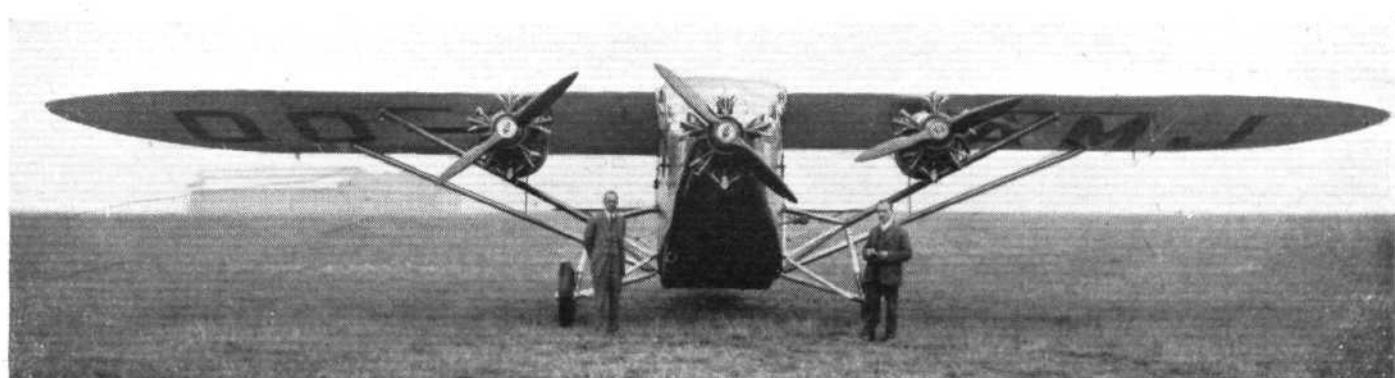
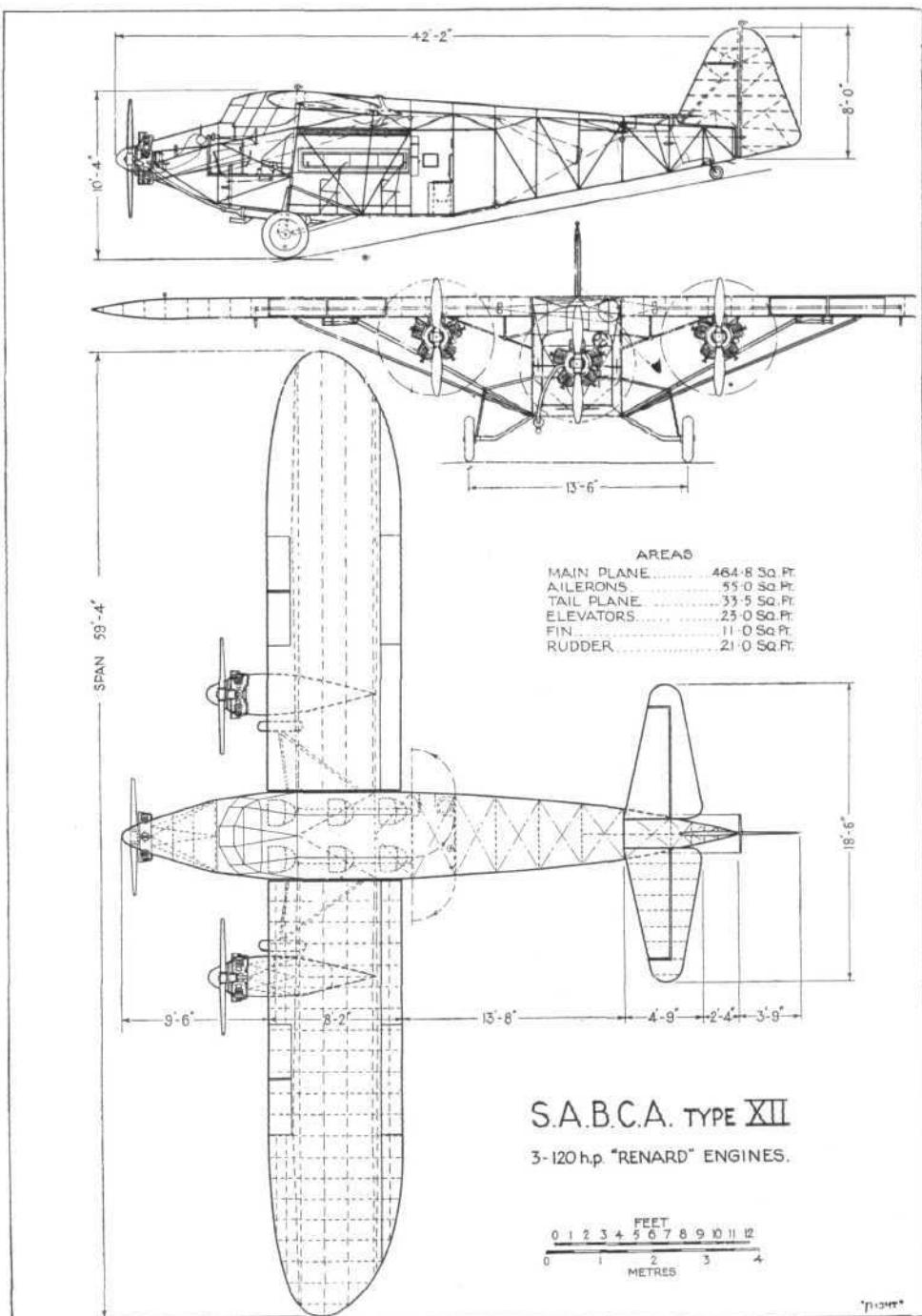
Air Transport

THE S.A.B.C.A. S.XII

ASMALL three-engined machine of the "feeder-line" type, the S.XII, designed and built by the *Société Anonyme Belge de Constructions Aeronautiques* is a high-wing braced monoplane of mixed construction. Designed for a gross weight of 2,800 kg. (6,160 lb.) the S.XII is fitted with three Renard radial air-cooled engines of 120 h.p. each, one engine being mounted in the nose of the fuselage and the other two outboard under the wings. The cabin has accommodation for four passengers. At the moment of writing the official performance figures are not available, but the estimated top speed is 185 km./h. (115 m.p.h.) and the cruising speed at 80 per cent. of maximum power, 170 km./h. (105 m.p.h.). The estimated landing speed with full load is 100 km./h. (62 m.p.h.), and by using the trailing edge flaps it is thought this will be reduced to 85 km./h. (53 m.p.h.).

The lay-out of the S.A.B.C.A. S.XII is shown in the general arrangement drawings and photographs. It will be seen that the outboard engines are placed close under the wings, a position which in this country is not usually considered very efficient aerodynamically. The wing is strut-braced, the front wing struts being round steel tubes with electron fairings, while the rear struts, also steel tubes, have wooden fairings. The wings do not fold. The wing has wooden spars and ribs.

The fuselage is of welded steel construction, with fabric covering.



GENERAL ARRANGEMENT DRAWINGS AND FRONT VIEW OF SABCA-S.XII: Variable camber gear is provided by the inner trailing edges of the wings.

All engine mountings are of welded steel tube construction, and engine cowls and petrol tanks are of electron.

The undercarriage is of wide track, and of the "split" type, each half consisting of a single wheel 800 x 150 fitted with Bendix brakes, and mounted on the usual tripod of axle, radius rod and compression strut. The compression struts do not run to the wing but to the front wing bracing struts, from which point a short strut is taken diagonally to the side of the fuselage, there to be anchored to a stout bulkhead in the plane of the front spar. A tail wheel is used instead of a skid.

To get good controllability without fatiguing the pilot, the elevators are horn-balanced, while rudder and fin are placed aft of the horizontal tail to give them greater leverage and also to avoid "blanketing" of the rudder and fin at large angles of incidence. Like the elevators, the rudder is horn-balanced, and the rudder chord is large at the bottom.

The ailerons, it will be seen, extend over the whole wing span. The inner portions can be operated by the pilot to act as variable camber gear, leaving the outer portions to perform the function as ailerons.

Two seats are provided in the cockpit, although normally it is intended that one pilot should suffice. The cabin has seats for four passengers, with plenty of room for them to get in and out without getting in each other's way. Many of the instruments are of the vertical



SIDE VIEW OF SABCA-S.XII: The vertical tail surfaces are placed aft of the horizontal tail.

scale type, and the instrument board has been arranged to make a survey of all the different dials as easy as possible.

Normally it is intended that the machine should have a range at cruising speed of 600 km. (370 miles), and the load is then divided up as follows: Tare weight, 2 014 kg. (4,430 lb.); fuel and oil, 270 kg. (594 lb.); crew of one, 80 kg. (176 lb.); pay load, 4 passengers and freight 500 kg. (1,100 lb.); gross weight, 2 864 kg. (6,300 lb.).

The wing span is 18.10 m. (59 ft. 5 in.), and the wing area 43 sq. m. (463 sq. ft.), which gives a wing loading of 13.6 lb./sq. ft. The power loading (based on 3 x 120 b.h.p.) is 17.5 lb./h.p. Official performance figures are not yet available.



THE SABCA-S.XII: The Renard outboard engines are placed close under the wings.

Air Mail Postage to South America

It was stated in the House of Commons on December 11 that it was possible to send an air mail letter of 5 grammes (about one-sixth of an ounce) to South America from certain European countries at an initial cost of 1s. 6d., whereas the minimum charge from this country was 3s. 6d. for half an ounce. The Postmaster-General commented that it was cheaper to send a letter of half an ounce from this country than from any other to South America. He held that the remedy for the high initial fees lay, not in a reduction of the unit of weight, but in a reduction of the very high charge for transport on that service, which is ten times greater than that on the Indian air service. Owing to the fact that payment was made to the French postal authorities in gold francs, the service was now being run at a heavy loss, and he was not prepared to take any steps which would increase that loss.

Australian Xmas Air Mail

At the eleventh hour the weather has been unkind to Air Commodore Kingsford Smith, who has been making a magnificent dash in the Avro 10 *Southern Star* from Australia to England with the Xmas air mail "rescued" from the *Southern Star* which crashed at Alor Star. Having reached Karachi on December 8—the sixth day out from Australia—he made the following rapid progress over the latter stages—December 9 Bushire, December 10

Aleppo, December 11 Athens, December 12 Rome, December 13 Lyons. It would seem that the "13th" was unlucky, for on the following day, owing to fog, he was unable to complete, as scheduled, the final stage to Croydon, where an official reception awaited him. Again, on December 15 he could only get as far as Le Bourget, and at the time of writing was expected to reach Croydon at last on December 16.

The Postmaster-General announces that the *Southern Star* is due to leave Croydon for Australia on December 18. Correspondence for Australia, the Straits Settlements and Malay States (and for New Zealand by ordinary route from Australia) will be accepted for despatch at sender's risk. Correspondence for other countries on the route will not be accepted. The inclusive charges (combined postage and air fee) will be 1s. 4d. per half ounce for Australia and New Zealand and 1s. per half ounce for the Straits Settlements and Malay States.

Suspension of Air Mails

The Postmaster-General announces that, owing to the suspension of the air mail service between Bucarest and Istanbul, air mail letters for Turkey now gain no appreciable advantage over letters sent by the ordinary service. Also, owing to the suspension of flying between Moscow and Irkutsk and Manchouli and Shanghai, the air mail service from this country to China now offers no appreciable acceleration over the ordinary service.

Airport News

CROYDON

EVERYONE at Croydon was deeply sorry to read of the death of Messrs. Wiersma and Van Onlangs, through the crash of the Royal Dutch Air Lines' machine, whilst on the homeward journey from Batavia to Amsterdam. Van Onlangs was not very well known at Croydon, only having done a few journeys here, but Wiersma was an old friend, having operated regularly on the Amsterdam-London route for several years. He was a very likeable fellow, and his untimely end is to be deeply deplored. One also offers sympathy to the Royal Dutch Air Lines for a most unfortunate accident on what has been a 100 per cent. service and a lesson on long-distance transport to the rest of the world. Let us sincerely hope that they will be free from any other such accidents.

On Sunday last Imperial Airways sent another Argosy out to Cairo for operation on the African route, and I understand the remaining Argosies are likely to be sent out also. The seventh H.P.42, known as *Hengist*, arrived during the week, and has been placed on service. Work is progressing well on *Hannibal*, which it will be remembered made a forced landing some time back near Tonbridge. This is the machine which when ready will be the last of the Eastern type H.P.42's to be sent out. It would appear that Imperial Airways are concentrating on the Empire routes.

A new fleet of Armstrong monoplanes is to be delivered next year, and these, I believe, are all destined for the East, probably on the Cape to Cairo route, so there will be a fair fleet of aircraft out there.

On Wednesday the first through mail left for Cape Town. Many notable people were here to see it off, and a

"talkie" picture taken showing the loading and various incidents just before the departure was put on the machine and will be shown in Cape Town the night the mail arrives.

Personal Flying Services, Ltd., who have for so long operated from Croydon have deserted us and removed to Heston, from which port they will in future operate. They are acquiring two further machines, so they must be anticipating big things next summer.

On Saturday a large party of people under the care of Messrs. George Lunn's, the tourist agents, visited the aerodrome and took a flight over London in *Hengist*. A special "talkie" was made by Pathé of the event, giving the impressions of the flight by the youngest and oldest members of the party. These parties are, I believe, to be a feature of tourist agencies in the future. It is understood that the tourist agencies will include aerial travel on many of their Continental tours.

Lady Bailey has paid several visits to the aerodrome during the week; she has been carrying out her cross-country flights for her "B" licence. Several other "A" pilots have completed "B" licence tests this week. Rollason Aviation Co. have just acquired the famous Shell-Mex "Moth" G-AAIM. I don't suppose there are many aerodromes in the country that have not been visited by this machine at some time or other, and it was always possible to identify it by its distinctive colouring, gold and scarlet. It is now used as a school machine, and is kept busily working.

The traffic figures for the week were:—Passengers, 454; freight, 40 tons.

P. B.

HESTON AIR PARK

HILARITY AT HESTON.—Friday night, December 11, was the scene of much gaiety and good fellowship when some 40 habitués gathered together for dinner and a following concert. Last year, when restaurant arrangements were not quite so advanced as at present, a similar dinner was held at a house of refreshment in the neighbourhood, but this year the powers that be at Heston decided that they could cope with such a gathering, hence this occasion. Mr. Nigel Norman himself had specially come up from Andover, where he is undergoing a staff course subsequent to his promotion to Sqd. Ldr. A.A.F. and his appointment to command No. 601 (County of London) (Bomber) Squadron. We were interested to hear from him some of the impressions which he had gained during his recent tour in America, and thus to have the opportunity of learning at first hand the state of flying over there as it strikes a visitor.

"Uncle," that familiar rubicund autocrat of Heston, who normally sits in the central office and rules those who want to fly, appeared to be the organising genius, and was much in evidence running round attending to the hundred and one things which make for smooth running on an occasion like this. As is usual at Heston, the dinner provided was excellent, and was only marred by the painfully persistent attentions of a press photographer, who appeared to have shares in the company marketing those new flash light bulbs.

Now that Miss Slade is club secretary and responsible for the restaurant and all the other internal arrangements,

we think she should be congratulated on the result of her unceasing labours for the comfort of everyone.

Several artistes contributed vocally to the pleasure of the evening when the party adjourned to the lounge after dinner, and by their excellent talents loosed the tongues and raised the spirits of all present. This caused many a vociferous chorus to be sung, and many a "new one" to be told before the party broke up.

The new bar was open for the occasion, and is the first part of the newly-built accommodation to be used. These additions are coming along speedily, and before long the new restaurant and the bedrooms should be attracting more attention to the already well-known amenities of Heston Air Port.

Among the newest tenants of show rooms are the Redwing Aircraft Co., Ltd. Flt. Lt. N. M. S. Russell will now permanently be in attendance at Heston, and from there he will operate the head sales depôt of this firm.

Due, no doubt to its "youth," the Redwing Co. has always been go-ahead, and has consistently shown its commonsense in initiating new ideas connected with its aggressive sales policy. At least three new Clubs have been started as a direct outcome of suggestions on the part of Flt. Lt. Russell—now we hear of still further developments which when they become facts will go a long way to making this firm one of the leaders in light aircraft markets—if not also in that of heavier aircraft!

Airwork School of Flying will be closed from December 21 to December 25, reopening on Boxing Day.

An Aerodrome for Dublin

THE question of a civil aerodrome for Dublin is again in the news, and it is learned that a group of Dublin business men, including members of the Irish Aero Club, are preparing plans to take over the derelict aerodrome at Collinstown, a few miles north of the City of Dublin. This is not the first time efforts have been made to utilise this aerodrome, and during the summer the Irish Aviation Co. operated a Desoutter monoplane from there, but this

company has since gone out of business. Collinstown was built during the war at a cost of over £250,000, and it is estimated that at least £15,000 would be necessary to put it in proper repair for use as a civil aerodrome again. Our Irish correspondent learns that although the Department of Industry and Commerce, who control aviation in the Free State, have not yet been approached, but it is certain that they will receive the proposals for the establishment of a civil aerodrome very kindly.

FINALE TO THE SCHNEIDER TROPHY CONTEST

WEDNESDAY, December 9, 1931, marks a niche in the annals of aviation. On the evening of that day a banquet was staged at Claridge's Hotel by the Royal Aero Club to celebrate the British victory in the Schneider Contest, 1931, whereby the trophy, originally dedicated in 1910 to the cause of aviation by M. Jacques Schneider, came into possession of Great Britain for all time. Upon this unique occasion, when some 350 guests were present, the chair was occupied by the Duke of Atholl, the President of the Royal Aero Club, and the guests of honour were the Schneider Team of R.A.F. pilots, Sqd. Ldr. A. H. Orlebar, Flt. Lts. G. H. Stainforth, J. N. Boothman, F. W. Long, E. J. Hope and W. F. Dry, and F/O L. S. Snaith. In addition, to share the honours of the evening, were Mr. R. J. Mitchell, of the Supermarine Co., the designer of the Schneider seaplanes, and Mr. A. F. Sidgreaves, managing director of Rolls-Royce, Ltd., whose engines enabled the record-winning speeds to be obtained. Another guest who was welcomed with rapturous applause was Sqd. Ldr. Bert Hinkler, who had only on Monday arrived in England at the conclusion of his remarkable flight of 10,000 miles or more from New York to London via the South Atlantic on an all-British small craft—a "Puss Moth."

The loyal toasts having been honoured, Sir PHILIP SASSOON (Under-Secretary of State for Air and Chairman of the Royal Aero Club), in proposing the toast of "The Schneider Team" first read a telegram from Lady Houston, who was unfortunately too ill to attend personally, in the following terms:

"To a company of gallant gentlemen, Lady Houston sends her heartiest greetings."

Sir Philip then said that he thought he was justified in claiming that the achievement of Great Britain in winning the Schneider Trophy this year, and thereby securing it for all time, could not be lessened by the fact that this year they had no other team competing. It detracted in no sense from the splendid performance of the British Schneider flight that the French and Italian teams were not able to compete against them. He ventured to believe that if they had been, the result would have been the same. It was by the team work that the pilots were able to achieve the victory and to put up the speed record of the World. At the same time it was entirely due to the great generosity of Lady Houston that it was possible for the Trophy to be secured by Great Britain. Following her splendid offer, the engineers and builders of the British aircraft had only six months in which to turn out the wonderful machine which gave Britain the victory. It was a feather in the cap of the British aircraft industry, and the victory was a proof of the general excellence of the organization, technical material and craftsmanship, and a proof of the strength and sureness of our resources. The contest had raised the speed of mechanical flight from 45 miles an hour in the first contest to over 407 miles an hour in the last contest. It had added greatly to man's knowledge of the diverse problems of aviation, and M. Schneider, when he created the Trophy in 1912, could hardly have foreseen the great progress to which it would contribute. Its scope had far outgrown the original intention. He was proud to be able to give welcome that evening to the pilots who had steered the machines to success.

THE DUKE OF ATHOLL then presented an engraved silver salver to each of the team in appreciation of their individual work. He then said that he was also glad to be in a position to recognise the meritorious work of Mr. R. J. Mitchell, of the Supermarine Co., who had designed the machines which had won the Trophy and Mr. A. F. Sidgreaves, the Managing Director of Rolls-Royce, Ltd., who had built the wonderful engines, by presenting each with a similar salver. In addition, he also gave to each and to the pilots, certificates of the performances of the various records they obtained. After reviewing the increase in speed from the early days when Howard Pixton first secured the coveted Trophy for Britain, the Duke called upon Squadron-Leader Orlebar and his team to respond.

Prior to this a similar presentation of a salver was made to the relatives of Flight Officer Brinton who was killed during practice flight, F/O Brinton's brother receiving it on behalf of the family.

AIR CHIEF MARSHAL SIR JOHN M. SALMOND (Chief of the Air Staff), replying for the R.A.F. said that on their behalf he would express their deep appreciation of their reception and entertainment by the Royal Aero Club, but he was loth to make a lengthy speech as he might suggest "the longer the spoke the bigger the tyre," and he proposed therefore to be brief. The Air Ministry realized that if in the future there were to be international contests initiated with or without Government support no British pilot would turn away from a machine, however dangerous, if it was to be flown for the honour of his country. Therefore it was incumbent upon those who were responsible for drawing up the regulations for any future contest to protect the pilots by ensuring that the factors of safety were not too low and the landing speed not too high. It was, he said, by the concentrated effort of the teams of the Supermarine Co. and the Rolls-Royce Co., that they were able to win the Trophy for this Country. He wished to express to the French Ambassador and their friends the Italians, their great disappointment at their being unable to take part at the last minute. He wished to register the appreciation of the Air Ministry of the organisation and help given by the Royal Aero Club throughout the preparations and the contest itself. The thousand-and-one things of details they had to look after could hardly be measured or expressed in words, right up to this final banquet. It was their duty to congratulate the Club and all the members of their hard-working Committee upon the success of their great organisation. He also offered thanks to the Navy for the great assistance they gave to them, amongst other things, by keeping the course, etc. In addition, he registered the appreciation of the R.A.F. of the members of the Supermarine Co. and the Rolls-Royce Co. for their untiring efforts day and night; and finally the munificence of Lady Houston, without which our aircraft constructors and engineers would not have had an opportunity of showing what they could accomplish. Lady Houston's gift in token of her love for her country had inspired the Air Force and on their behalf he wished to thank her.

Sqd. Ldr. ORLEBAR said they were very lucky to be chosen to represent the Air Force, and to work in conjunction with two such competent firms. It was naturally a great disappointment to them that France and Italy were unable to compete, and it must have been equally disappointing to their pilots in not being able to come over, owing to the difficulties and the casualties which they had had. The speaker then called upon the other pilots of the team to help him in his nervousness by standing up and supporting him. We pilots, he continued, had a very great deal to live up to, but all were

ready and equally able to pilot their machines when called upon. In comparing pilots to jockeys, he said the latter were not much use without a good horse, and in their own case he thought RR. out of Supermarine was a wonderful two-year old for their pilots to ride. They could not have been better served than by the RR. and Supermarine. One after another, as they required them, other engines and machines were produced, and they were then asked was there nothing more they could produce for them. After paying a tribute to Lady Houston, he thanked everyone for the very kind way they had been received.

SIR ROBERT MCLEAN, replying on behalf of the Supermarine Aviation Works (Vickers), Ltd., reminded them that the beginning of the team work lay with Tommy Sopwith and Pixton, next Paine, etc., and he desired to have Commander James Bird associated with this toast, as he laid the foundation for the first victory, and again, in 1929, as Chairman of the Schneider Trophy organisation. He also wished to mention Mr. Mitchell, of their company, and others who had so helped to the success achieved.

MR. A. F. SIDGREAVES, for Rolls-Royce, Ltd., said he was at a disadvantage in being the fourth speaker to the same toast, as the ground was all cut away, one might say, by being forestalled by previous speakers. But he would express, on behalf of the R.R. Co., their appreciation of the wonderful spirit of co-operation of the R.A.F. pilots; also of the R.A.F. as a whole, and the Air Ministry, as no serious effort to secure the trophy without such co-operation could have been made. The absence of other countries' pilots was sincerely regretted by them all, although their preparations were in hand before ours, we being left with but a few months to complete our preparations. He was inclined, however, to thank them for the late notification of non-participation, as the fact of their withdrawal at the last moment, he thought, helped to keep up the keenness of all concerned in Britain to ensure the winning of the Trophy. He would give high praise to hundreds of their employees who had worked wholeheartedly towards the success, and finally he thought it was a wonderful gesture of their interest when some 600 of them went, at their own expense, to witness the fly-over as a finale to their grand team work. It was, he continued, a cause for congratulation that the Trophy was obtained by us, and he then expressed the view that the Schneider Trophy contest had almost outrun its usefulness. Its value to British aviation had been greatest in connection with the development of the machines which were so necessary, but apart from the question of expense, which had become immense, there was the great and serious question of danger because of the absence of any limit in the landing speed. He put forward the suggestion that someone should give another trophy with conditions carefully drawn up, but said that he would not suggest the conditions. Speed, one felt, must still be the main factor, but it should not be at the sacrifice of safety. A reasonable limit, he considered, should be fixed as to landing speed.

LORD LONDONDERRY, Secretary of State for Air, in proposing the toast of "The Royal Aero Club," reminded his hearers of the early association of their President, the Duke of Atholl, with aviation, when Mr. Dunne was developing, "in the long ago," the first tailless machine. After giving a résumé of the important work and functions which devolved upon the Club and referring to early pilots from Lt.-Col. Moore-Brabazon (No. 1), Charlie Rolls, etc., he concluded by saying the Club could look back with pride upon what it had achieved in 30 years and with this work he was happy to associate the name of their Secretary, Commander Perrin, during all that period.

THE DUKE OF ATHOLL, in reply, recorded the various moves by stages of the club, commencing with a single room at 110, Piccadilly, to the present fine premises at 119, Piccadilly.

LT.-COL. MOORE-BRABAZON, in proposing "The Guests," remarked that although the speed of aeroplanes increased vastly, not so with speeches. From the speeches he had listened to, he had gathered the knowledge that we had won a trophy termed the Schneider Trophy. That was by the way. He then referred to a guest amongst them—Bert Hinkler—our Bert—he said had forgotten more about practical aviation than they, all combined, knew, but he was weak on the publicity side—but he thought there were plenty present who could give him some practical lessons upon that subject. They were glad to pay great honour to Bert Hinkler, and on behalf of the Royal Aero Club he was pleased to announce that they had conferred upon him the gold medal of the Club, the highest honour in their power to bestow.

THE FRENCH AMBASSADOR, in response, expressed his congratulations upon the victory in the Schneider Contest.

SQDN.-LDR. HINKLER said he did want them to know how much he appreciated the honour done him by the Club, and the welcome given him, almost an exile, upon his return. He had little to say about himself, except, perhaps, that he would be proud if his "tour" had supplemented the achievements of the Schneider team in demonstrating the supremacy and value of British aircraft; but some time ago he found himself in possession of a good English "ship," and the rest followed naturally. He modestly described how he simply kept the nose of his Puss Moth pointed in the right direction and he thus landed here. Having arrived, he found his "ship" as good as ever and it was impossible for him to express in words the satisfaction and pride which he felt in British aircraft. Before he obtained his plane, he had earned the confidence of Lord Wakefield, which enabled him to exhibit the great reliability and usefulness of British aircraft. He thanked all for the wonderful welcome given him upon his return.

COMMANDER BIRD, after proposing a vote of thanks to the Chairman, thanked the Duke most sincerely for presiding at that banquet. Although now at the end of the evening's proceedings there, he would say there was the floor in the next room where dancing awaited them.

And thus was the end of the Schneider Trophy celebrated.

Amongst those present were:—
His Grace the Duke of Atholl, The French Ambassador, Lord Londonderry (Secretary of State for Air), Lord and Lady Wakefield, Lord Herbert Scott, Maj.-Gen. Lord and Lady Loch, Sir Philip Sassoon (Under-Secretary of State for Air), Flt. Lt. J. N. and Mrs. Boothman, Flt. Lt. F. W. and Mrs. Long, Sqdn. Ldr. H. J. L. and Mrs. Hinkler, Lt.-Col. J. T. C. Moore-Brabazon, Mr. and Mrs. R. J. Mitchell, Sqdn. Ldr. A. H. and Mrs. Orlebar, Flt. Lt. G. H. and Mrs. Stainforth, Flt. Lt. E. J. L. and Mrs. Hope, F/O L. S. and Mrs. Snaith, Flt. Lt. F. W. and Mrs. Dry, Com. James and Mrs. Bird, Lt. Col. W. A. and Mrs. Bristow, Sqdn. Ldr. C. G. Burge, Flt. Lt. H. A. and Mrs. Castaldini, Sir Edward Crowe, Lt. Col. M. O. and Mrs. Darby, Air Vice-Marshal H. C. T. Dowding, Lady Drogheada, Lady Eliebank, Sqdn. Ldr. T. H. and Mrs. England, Lt. Col. L. J. R. Fell, Group Capt. and Mrs. G. B. Hynes, Count and Countess Johnston-Noad, Dr. Bruce Jones, Air Vice-Marshal Sir Charles and Lady Lambe, Air Vice-Marshal C. A. H. and Mrs. Longcroft, Lt. Col. F. W. Lucas, Wing-Com. R. L. G. Marix, Com. and Mrs. George Murray, Lt. Col. Sir Francis and Lady McClean, Sir Robert and Lady McLean, Group Capt. E. R. C. and Mrs. Nanson, Lt. Col. M. O'Gorman, Mr. and Mrs. F. Handley Page, Flt. Lt. C. H. and Mrs. Potts, Air Marshal Sir Geoffrey and Lady Salmond, Air Chief Marshal Sir John and Lady Salmond, Mr. H. Gordon Selfridge, Wing Com. and Mrs. P. C. Sherren, Mr. and Mrs. J. D. Siddeley, Mr. A. F. Sidgreaves, Sqdn. Ldr. F. O. Soden, Admiral Sir Arthur Waistell, Com. and Mrs. Whyham, Mr. and Mrs. F. R. Banks, Mr. and Mrs. A. J. A. Wallace Barr, Messrs. E. C. Bowyer, Griffith Brewer, Group Capt. and Mrs. E. F. Briggs, Capt. H. S. Broad, Maj. J. S. and Mrs. Buchanan, Maj. G. P. and Mrs. Bulman, Mr. and Mrs. H. Burroughes, Mr. and Mrs.

J. C. Cantrill, Flt. Lt. C. and Mrs. Clarkson, Mr. J. R. Ashwell Cooke, Maj. H. J. Corin, Mr. E. C. Gordon England, Mr. and Mrs. W. Lindsay Everard, Messrs. E. B. Fielden, John Fox, Group Capt. N. J. and Mrs. Gill, Mr. H. R. Gillman, Mrs. Hawker, Wing Com. B. L. Huskisson, Mr. M. Jackaman, Capt. and Mrs. A. G. Lamplugh, Messrs. W. Lappin, John Lord, A. C. Lovesay, Fred May, Maj. R. H. and Mrs. Mayo, Maj. R. H. S. Mealing, Mr. H. Victor Paine, Capt. L. F. Peat, Com. H. E. Perrin, Mr. and Mrs. St. John T. Plevins,

Mr. H. E. Pooley, Capt. and Mrs. J. L. Pritchard, Mr. and Mrs. E. L. Ransome, Mr. and Mrs. H. Reynolds, Capt. C. P. Robertson, Lt. A. Sala, Maj. F. P. and Mrs. Scott, Mr. and Mrs. H. O. N. Shaw, Mr. Stanley Spooner, Miss W. E. Spooner, Mr. B. Stevenson, Maj. O. Stewart, Capt. R. H. and Mrs. Stocken, Mr. F. M. S. Tegner, Mr. and Mrs. H. J. Thomas, F/O. M. F. Tomkins, Maj. C. C. Turner, Mr. M. H. Volk, Mr. D. Whitelaw, Mr. and Mrs. D. J. Hollis Williams, Capt. C. B. Wilson, etc.



"CITIES AS AIR PORTS"

UNDER the chairmanship of Mr. R. Holland-Martin, C.B., F.S.A., Hon. A.R.I.B.A. and President of the club, the Architecture Club held their twentieth dinner at the Savoy Hotel on Wednesday evening, December 9. The aesthetic value of airport and aerodrome buildings is now rapidly being recognised to be of great value in the establishment and popularisation of aerial termini. England is perhaps somewhat backward in developing airports as places which will be popular for the public to visit during weekends. Both Germany and the U.S.A. have already realised the value to aviation of such a popularity and many of their airports are designed with this point of view kept well in mind.

Not so long ago we were fortunate enough to be shown round several of the German ones, and the crowds which were to be seen watching the aircraft and partaking of much solid and liquid refreshment in the attractive restaurants and their adjacent terraces at, for example, Templehof, the main terminal airport of Berlin, at weekends, is a revelation. In this country only three aerodromes have so far studied the question of the provision of public facilities to any great extent, but there is no doubt that in future architects will have to consider all the buildings, not only from the point of view of architectural beauty, but also of their attractiveness to others than air enthusiasts. Perhaps we may arrive at the day when, as Mr. Nigel Norman put it, town planning people will not feel that their aerodrome must be relegated to an out of the way spot, but when they have a really beautiful open space they will be led to say "What a beautiful site, why, it is just the place for an aerodrome."

Several speakers voiced their views on the question of "Cities as Air Ports." The first to take the platform was JOHN DOWER (Secretary of the Aerodromes Committee of the R.I.B.A.). Mr. Dower showed an interesting series of lantern slides illustrating many of the better planned and more modern German Aerodromes, several American ones and two or three of Heston Airport. In a few introductory words he said that town planning experts must in future reserve sites for airports, as there was no doubt that there was an insufficient supply of these in the country.

Lt.-COL. F. C. SHELTERDINE (Director of Civil Aviation), said he would confine his remarks to London, and to Croydon in particular, as he knew nothing of architecture. He then sketched the history of the London terminal Aerodrome, starting from the year 1919 when the war-time aerodrome of Hounslow was used. This, he said was a bad aerodrome; bad from the point of view of fog and also in that the aircraft had to traverse quite a considerable section of the city; further, he said, it belonged to the War Department who wanted it back again. In 1920 therefore, Croydon was taken over; this also was a war time aerodrome and the majority of the buildings were temporary ones put up by the manufacturers who had been operating there, in fact he and the late Sir Sefton Brancker always agreed that in those days the entrance to Croydon looked more like Port Said than anything in the way of English architecture. In 1923 the Civil Aviation Advisory Board after having examined the question carefully and gone into all other possible sites, advised that Croydon should be retained and re-organised. In those days it was divided by a road and really consisted of two aerodromes. This road was then closed and the whole turned into one large aerodrome. In 1925 the new buildings on one side were designed and these were finished in 1928. No doubt he said, many architects would say that they were of the wrong type and had no architectural beauty, but such experts should remember that in those days there was no previous experience to go on and these buildings then fulfilled the purpose for which they were intended. Now that air transport had grown however, it was to be admitted that they lack many of the amenities it is essential should be provided for passengers. At Croydon these have to wait upon the tarmac in the wind and rain after they have passed the Customs, before they splash out to their respective machines. In future this must be altered and we undoubtedly must come to something like the railway station where passengers can remain under cover until they embarked. Col. Shelmerdine then discussed the actual location of Croydon and the controversy there had been about its efficiency. Undoubtedly he said, the best way would be to have an aerodrome suitable for all aircraft in the centre of London, but this had so far been found impracticable. The use of a small central aerodrome with a shuttle air service transferring passengers from the trans-continental aircraft by smaller machines to the centre of the city, was not, he felt a practical proposition, for the time lost in the transfer would be too great. Failing the large central aerodrome, he therefore thought that improvement of the ground transport was the next step to be made. Internal air traffic in the country would grow, he thought, for distances of 200 miles and over, but only if there were suitable aerodromes all over the country and particularly around all sides of such cities as London, for at present it was palpably absurd that travellers from the north should have to go all round London to land at Croydon. In this respect he thought that the authorities were very much behind-hand in establishing such circumferential aerodromes. The question of marine aircraft had also been considered, but neither the many London reservoirs nor the river Thames had been considered feasible, as it was found to be impossible to keep a sufficient area of waterway clear of other traffic, a conclusion which had also been reached in Germany and many other countries. He had a great admiration he said, for architects, but he hoped that they would not sacrifice in their future aerodrome buildings so much to their aesthetic senses as they had done at Delhi where he had been forced to live in one of the so-called "bakers-ovens" for in the bitter cold of the Punjab winter when none of the chimneys would draw he had been constrained to think of architects in a very different manner from that in which he would wish to do so.

"CITIES AS AIR PORTS"

MR. NIGEL NORMAN (Director of Heston Air Port) said that aviation was really in the position of a beautiful young lady who had just taken to the stage and that evening she no doubt found herself somewhat embarrassed, as this young person was not rich and she was rather in the position of having caught the eye of all the most distinguished dress designers! As a word of advice to the architects present, he would like them to consider the question he said, not so much from the point of view of what was at present in existence, for fashions change and what was really wanted was a careful consideration of the line and colour for next year. Referring to his recent visit to the U.S., Mr. Norman said that over there they were in many cases prepared to spend some £25,000 on a single hangar and under such conditions could obviously do very much as they liked, but we in this country were much more bound by the amount of money which could be afforded. A matter of paramount importance was the facilities for passengers who must be protected from the weather, right from the machine to the station itself; particularly so, as in the future he visualized having hundreds of passengers to deal with where at present they only had them in tens, and there would also be many more machines and therefore he thought, that even those modern looking buildings which had been seen illustrated on the screen would have to be altered. During his visit he had seen the airport of Detroit which was situated right in the centre of the city, but it was suitable for present-day machines and on occasions it had over 400 aircraft pass through in one day. A point which he thought had not been raised before was that in future, cities would tend to develop round suitable airports instead of as at present, and this was a point which should be borne in mind by all town planning committees. He then went on to make reference to the Autogiro and the way in which such a craft might solve the question of landing in small spaces nearer the centre of existing towns, and Mr. Norman visualized a very great increase in the number of private persons travelling by air when such machines were in immediate use. He then thought it quite possible that their numbers would become very much greater than the numbers of those travelling on long distances. He went on to stress the importance of attracting people to the airports by the help of architecture, and in conclusion deprecated the poor appearance of the last few slides (Heston), but this he said was entirely due to the "young lady's" poverty and not to any lack of enthusiasm.

DR. RAYMOND UNWIN (President, R.I.B.A.) said that the last speaker had shown the importance of securing an attractive appearance to aerodrome buildings. He then referred to the fact that within recent years architects had had to adjust their technique, in the first place to cater for the whole populace taking to wheels. This technique had, he said, been disregarded by the authorities with the result that hundreds were being killed all the time; now, he said this same populace was becoming angelic and taking to wings, and they would have to readjust their technique once more. Town planners had, he said, been unconsciously catering for this winged populace by designing more rational cities wherein the buildings were distributed along a background of open spaces with open bands leading out in all directions; therefore, the smaller aircraft to which Mr. Norman had referred would in all probability be able to use these spaces in the more modern cities. Such provision must now be made consciously, and they must also think about the design of aerodrome buildings. In order to do so, it would be essential, he said, to have some one person trained to visualise the whole when it was finished, for it was only in this way that an attractive building could be produced, and that some of the haphazardness of existing buildings be eliminated.

COL. THE MASTER OF SEMPILL said he would like to pay tribute to the splendid work of Mr. Nigel Norman in establishing Heston Air Park. He said that the previous speakers had placed their buildings on the edge of the aerodrome; he would, however, point out that these could also with advantage be placed in the centre, a position which would greatly decrease taxiing of the aircraft. He made reference to the possibility of using concrete or other surfaced run-ways now that that "agricultural instrument" the tail skid, was rapidly being replaced by a tailwheel. Such run-ways, he said, prevent the mud which is so prevalent at some British Aerodromes. Col. Sempill made reference to the presence of Dr. Eckner, and said that the use of airships would in the future bring other airport problems to be solved. He also endorsed Mr. Norman's remarks concerning the necessity for making the aerodrome buildings attractive, so that not only the general public for even the members of the Architects Club would spend their spare time there.

MR. G. L. PEPLER, F.S.I. (Chairman of the Aerodromes Committee of the R.I.B.A.), referred to the work the late Sir Sefton Brancker had done, and what Col. Shelmerdine and Mr. Mealing were now doing. Sir Sefton Brancker, he said, had done a very great deal to make them airminded, and certainly their souls were in it if not their stomachs. Aerodromes, he said, deal with the newest form of transport, and must be brought into line with the existing life of the community, for he realised that aviation was important. Airport planners must, therefore, avoid the mistakes made by such older forms of transport as the railways, in order that these may be worthy of their position in that community.

LADY MAUD HOARE said that in her mind two problems had not been touched on, one was the combination station for ground and air transport that is short-distance and long-distance transport, a sort of tram and train station in fact, and the other was the fact that in all the slides which had been shown there was nothing to be seen of railways. She thought that it would be a great advantage to have the railway at Croydon. She referred also to the aerodrome at Leipzig Halle, which was adjacent to several towns, and she thought that those responsible for airports might possibly widen their views, and with advantage make such stations convenient to more than one city.

MR. C. W. GLOVER then gave a short description of his solution of the central aerodrome for London, which had already been referred to by Mr. Norman, and which was described in FLIGHT for June 12. He showed a series of slides depicting the large run-ways, which were over half a mile long and 300 ft. wide, that is, approximately four times as long and four times as wide as London Bridge, and explained that the capital cost, although it might at first appear appalling, was not really so, in that all the supporting buildings were sectionalised and self-supporting, as the 76 acres of floor space could house such markets as Covent Garden and Smithfield, and, in fact, it could become the marketing centre of London.

THE CHAIRMAN closed the discussion with the hope that architects were now beginning to understand what aviation wanted, and they would, therefore, soon be able to design aerodromes worthy of it.

Airisms from the Four Winds

Hinkler Honoured

THE Air Ministry announces that H.M. the King has sent a message of congratulation to Sqd. Ldr. H. J. L. Hinkler, A.F.C., D.S.M., on his outstandingly successful flight across the South Atlantic. On December 12 "Bert" was accorded a civic welcome at Southampton—which town he has made his headquarters since the war—when he flew down there in his D.H. "Puss Moth." He landed at Atlantic Park, the site of the future municipal airport, where a large crowd had gathered to give him an enthusiastic greeting. In reply to an address of welcome by the Mayor, Councillor F. Woolley, Hinkler said the real way to see the world was to get a good little British aeroplane. If you looked after it, it would give you good service, safety, pleasure, and a wonderful education. Among those present on this occasion were Mrs. Hinkler and Mr. Jack Matthews, who attempted the flight to Australia with Mr. Eric Hook last year. To-day, Friday, Bert Hinkler is attending a public dinner at Grosvenor House, given by the Air League of the British Empire, of which he has been elected an honorary life member.

Madagascar-Paris in 5 days

CAPT. GOULETTE, accompanied by M. Salel, flying a Farman 190 fitted with a Lorraine Dietrich Algo engine, who recently accomplished a flight from Paris to Madagascar in 4 days 7½ hr., has just broken the record for the return journey with the following itinerary:—

December 2, left Tananarive 04.30; arrived Dar-es-Salaam 15.10, left 23.30. December 3, arrived Djibouti 15.20, having landed at Mogadiscio for 40 min. December 4, left Djibouti 03.00, arrived Assuan 14.05, left at midnight. December 5, arrived Tunis 14.45, having landed at Benghasi *en route*. December 6, held up at Tunis owing to bad weather. December 7, left Tunis 05.35, arrived at Le Bourget 15.27, having landed at Lyons to ascertain weather conditions. Shell-Mex, Ltd., received the following telegram from MM. Goulette and Salel:—"We have utilised for flight Marseilles-Tananarive accomplished in record time 4 days 7 hr. 30 min. Shell fuel and Super Heavy Oil stop. Delighted with results obtained and reception your agents on whole route. Goulette, Salel."

The Speed of Birds

AN American pilot, Lt. R. W. Wicks, has conducted some interesting tests in ascertaining the speed of birds, by chasing the birds in his aeroplane and checking their speed with his air-speed indicator. A flock of geese was found to attain a speed of 56 miles an hour. Wild ducks registered 46 miles. Teal travelled at 75 miles an hour. Grouse reached a speed of 58 miles an hour.

An Irish Flight to Ceylon

A RACE between two members of the Irish Aero Club to Ceylon, which was to have started this month, has been declared off, and one of the participants has returned to Colombo by boat. Mr. M. C. A. Scally, however, is determined to fly the course, "for the fun of it," and is at present in England making arrangements for the delivery of his machine, a Comper "Swift." He is expected to arrive in Ireland shortly with the aeroplane, and will spend a month flying round the country while

the Government departments get busy on arranging his papers for the flight. Some of the daily newspapers are making hints of romantic endings to this flight, but Mr. Scally is keeping his own counsel, and appears to be enjoying the fun immensely. He is well-known in motor-cycling circles, and has been champion clay pigeon shot in Ireland for some years.

A Nazi "Air Arm"

HERR HITLER, head of the "Nazi" party in Germany, has issued an order addressed to members of the party "trained in the flying arm" requesting them to offer their services for the formation of a Nazi flying corps. It appears that a sort of flying club has been formed by the Nazi party, which is legally unobjectionable, and the allusion to the "flying arm" possibly refers to ex-war pilots. The "order" created some stir, though the report that the Nazi party had placed an order for 25 aeroplanes has been denied on very good authority. The party's funds, apparently, are not sufficiently flourishing to permit of such a step.

The Fairey (Napier) Long-range Monoplane

THE Fairey (Napier) long-distance monoplane is still returning from Egypt. On Saturday, December 12, Sqd. Ldr. Gayford and Flt. Lt. Bett brought it from Lyons to Le Bourget. Presumably it will reach England in due course.

Aviation is More Blessed than Some

MAJ.-GEN. SIR WYNDHAM CHILDS, speaking at the Livery Luncheon held by the Worshipful Company of Stationers Livery Committee on Tuesday, December 15, in the Stationers Hall, declared that the police were at present being asked to do the impossible. He attributed the rise of undetected violent crime nowadays to the fact that both the Police Force and the general public were suffering from too much ridiculous legislation designed by grandmotherly busybodies. This legislation made it necessary for the police to devote their time to raiding night clubs and apprehending street-corner betters when they ought to be safeguarding the lives and property of the country's citizens. It was time, he said, that the Government realised that we were grown-up and that we were old enough to do without such unwarranted petty restrictions as were now imposed upon our daily lives in such quantities. We in the Aviation World may be thankful that aviation has so far almost entirely escaped such legislation, and although as citizens we are still restricted in many paltry ways, yet our business is comparatively free—let us hope that it may remain so.

Names on Roofs of Railway Stations

IN the House of Commons, on December 9, Lord Apsley raised the question of the Air Minister requesting railway companies to have the name of each station painted on its roof for the information of air pilots. To this Sir Philip Sassoon replied that the names might get obscured by smoke, and pilots might be tempted to fly dangerously low in order to read them. Another scheme had been suggested which had been approved by the Air Ministry, and had been issued by the civil aviation section of the London Chamber of Commerce to local authorities and other bodies through the country.



AVROS FOR THE AIR MINISTRY: The first eight of a batch of Avro Lynx Tutor type 621 training biplanes supplied recently to the Air Ministry.

Air Flow

ONE often wonders how greatly the rate of progress in aeronautics has been slowed down by our inability to see the medium in which we are working. The designer of the mouldboard of a plough could see what happened to his furrow, and could alter the ratio of length to breadth and the angle of twist until he got a mouldboard which laid the furrow in just the way he wanted. The designer of a ship could watch the sort of bow wave his vessel set up at various speeds and angles of heel, and could see whether or not the stern dragged a lump of water after it, and could alter his lines until fairly clean runs were obtained. The unfortunate aircraft designer, on the other hand, has had very little help from his eyes, has had to grope about blindly, so to speak, and to try to imagine what was probably happening around his wings and his fuselage. A certain amount of assistance in this respect has been obtained by means of aluminium powder dropped on the surface of water in which a model wing, etc., was partly submerged, but the number of people who have been fortunate enough to see for themselves the sort of flow patterns that result has of necessity been very limited.

That a large number of people *are* interested in seeing this was amply proved by the record attendance at the lecture and demonstration given by Mr. W. S. Farren, lecturer in aeronautics at Cambridge and in aircraft structures at the Royal College of Science at South Kensington, before the Royal Aeronautical Society on December 10.

Col. the Master of Sempill was in the chair, and in introducing the lecturer he mentioned that the Society was indebted to the Fairey Aviation Company for having undertaken the transport of Mr. Farren's rather heavy apparatus from Cambridge to the Royal Society of Arts.

Mr. Farren said he would not weary the audience by reading the written paper, but would give a summary thereof, and then proceed to what he knew they were all

most interested in, the demonstration of the smoke tunnel used for making the air flow visible by projection on the white screen.

In reporting Mr. Farren's lecture and demonstration we are thus in some difficulty about the manner of presentation,

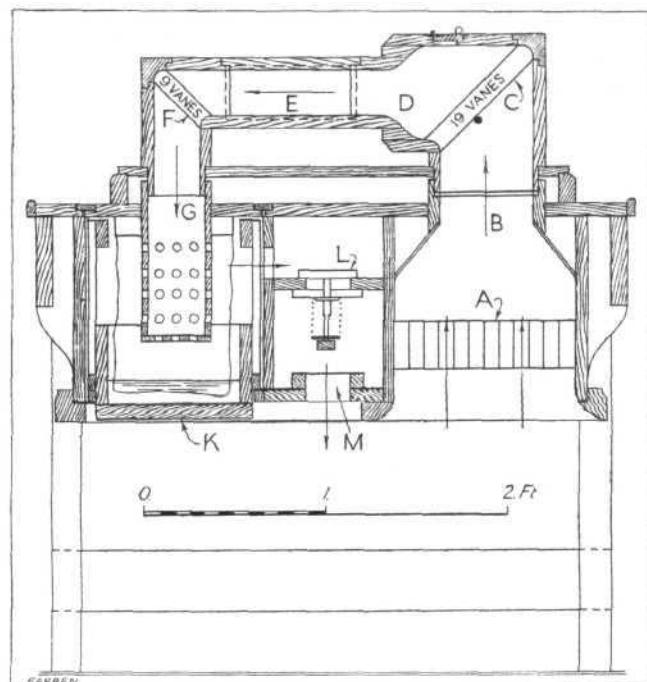
but it is thought that perhaps the most satisfactory way is to combine in our report Mr. Farren's written paper, his spoken summary of the paper, and some impressions of our own of the actual demonstration.

Mr. Farren was most careful to disclaim any credit as the originator of the smoke tunnel apparatus. In its original form this was designed by Mr. Simmons. All Mr. Farren claimed to have done was to re-design the apparatus in such a way that it became more compact and convenient to use, and also he had introduced throttle control for suddenly varying the air speed, and substituted a vertical air inlet for the horizontal one of the original apparatus. The latter type had the disadvantage that the entering air was disturbed by movements of the operator's body.

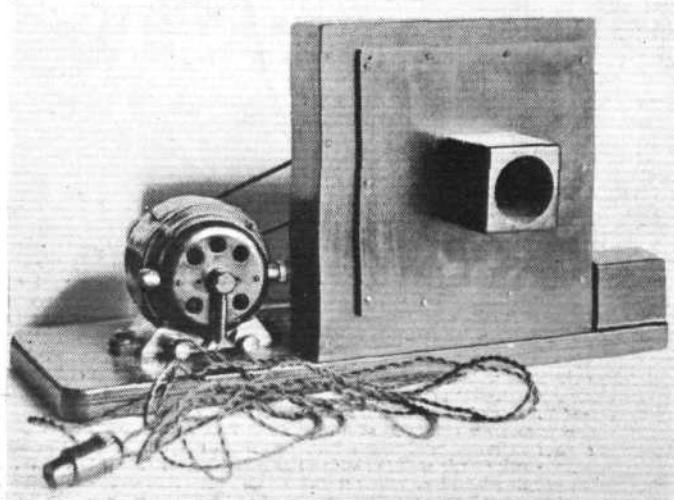
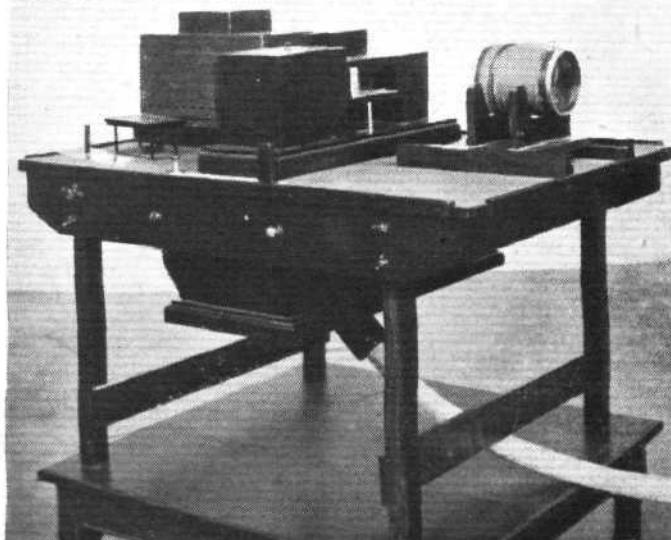
In introducing his apparatus, Mr. Farren says that he was convinced that we must develop and train our "air sense," using the expression

to denote training ourselves to predict the behaviour of air in the circumstances which are of concern to us. He had found that, in teaching aerodynamics at Cambridge, it was a great advantage to be able to use apparatus which intrigued the imagination rather than instructed the intellect. For that reason he always insisted on using silk streamers in the wind tunnel. In the lecture theatre it was more difficult to make the flow visible to an audience of anything from 100 to 150 students, and the problem was solved by his seeing in June, 1929, the smoke tunnel invented by Mr. L. F. G. Simmons, of the N.P.L. By October of the same year he had such a tunnel in full working order.

The type of smoke tunnel used by Mr. Farren for his demonstrations had cost approximately £65, exclusive of the projecting lens. The latter had, we gathered, been acquired in a not strictly orthodox way, but Mr. Farren



MR. FARREN'S SMOKE TUNNEL: Cross-section showing the arrangement.



THE FARREN SMOKE TUNNEL: On the left a general view of the apparatus, and on the right the exhausting fan. The rotor is 8 in. diameter and 1 in. wide, and is surrounded by a volute chamber.

said that a lens such as he used (a Zeiss 70-cm. F.5 camera lens) was not an absolute essential, and that a lens with a 3-in. aperture would give quite good results in smaller halls.

The smoke tunnel redesigned by Mr. Farren from Mr. Simmons's original model is shown in section in one of our illustrations, and an external view in a photograph. Mr. Farren's explanation of the apparatus was as follows:—

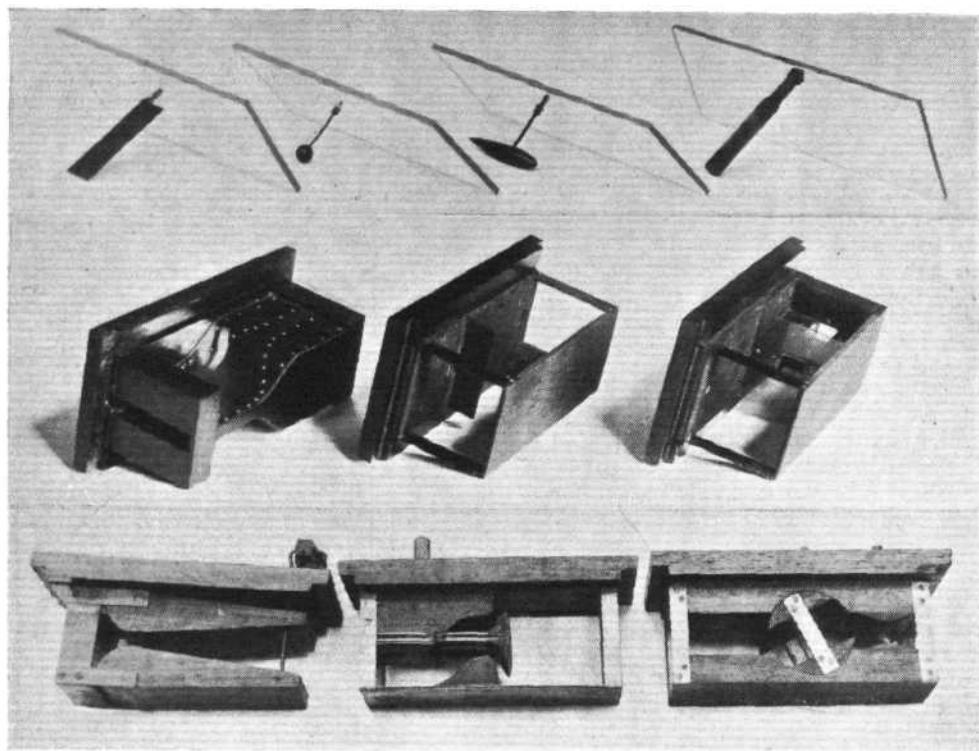
"The base of the apparatus is a box approximately 3 ft. long, 12 in. deep and 12 in. wide. One end of this contains a honeycomb (A) 12 in. x 12 in., through which the air passes vertically. It is contracted at (B) to 6 in. x 6 in. and turned through 90 deg. by vanes at (C). At (D) it is contracted to 3 in. x 3 in., and passes to the working section (E) round another 90-deg. bend at (F) into the other end of the base, contains the device for removing the acid. This consists of a perforated box (G) surrounded by a gauze curtain (H), which consists of one layer of butter-muslin between two of stiff gauze. The gauze dips into a wooden tray (K) containing a solution of ammonia. After passing through the gauze the air passes through a throttle (L), in the central part of the base, and from this to the exhaust fan by a 2-in. rubber pipe at (M)."

"Various types of fan are used, according to requirements, but a very simple one seems to be quite effective for all ordinary purposes. The rotor is driven at speeds up to about 1,500 r.p.m. by a motor whose speed is controlled by a rheostat arranged as a potentiometer."

"The whole of the tunnel and fan, with the exception of the vanes (C) and (F) and the shaft and bearings for the rotor, is of woodwork. The optical arrangements are simple; a 250-watt metal filament lantern lamp is used. The light passes first through a 6-in. condenser of 6½-in. focal length, and then to a 10-in. condenser of 13-in. focal length. This is directly in contact with one side of the working section, and converges the light through the tunnel to the projecting lens."

Method of Producing Smoke

Mr. Farren said that the technique of using titanium tetra-chloride was one that had to be learnt by somewhat bitter experience. He himself appeared to have mastered the technique very well, and showed very considerable dexterity in dealing with it. For introducing the liquid into the air stream or for depositing it on the model, he used pointed glass rods. It was important that the holes



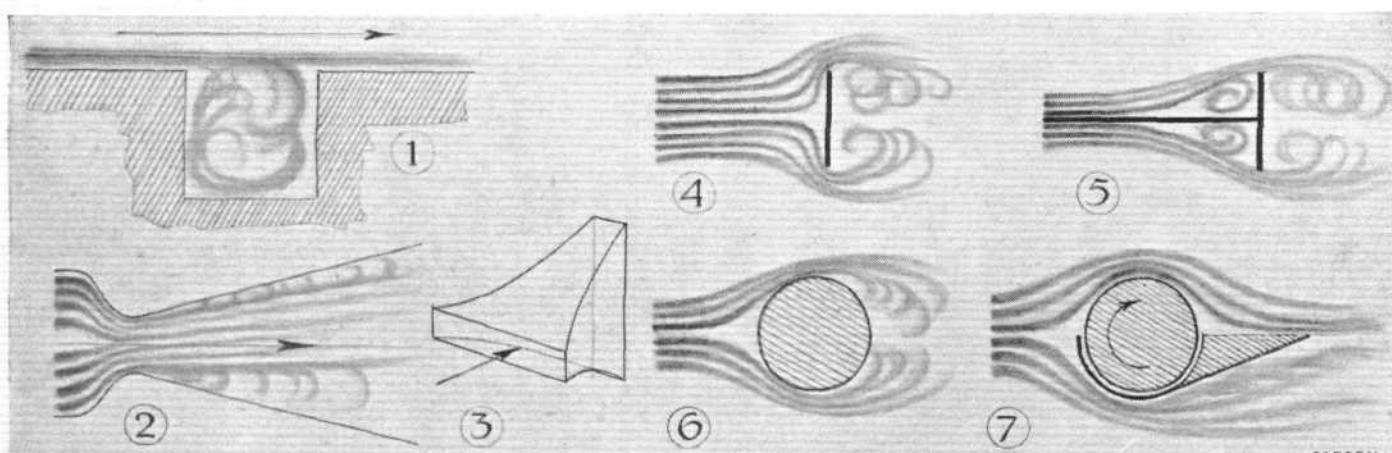
SOME OF THE MODELS USED: Top, mounted on glass, interchangeable with sides of tunnel, are an aeroplane wing, a sphere, R. 101, and rotating cylinder. Centre, mounted on wood, interchangeable with lid of tunnel, are pipe of varying shape but constant cross section, sharp-edged orifice, and contracting pipe (three-dimensional). Bottom, models with moving parts. Venturi tube, poppet valve, and barrel throttle.

through which the rods were inserted should be closed at once when the rod was withdrawn, as otherwise the flow in the tunnel might be considerably disturbed. If the rod was to be left in place, the opening around it should be plugged with cotton wool.

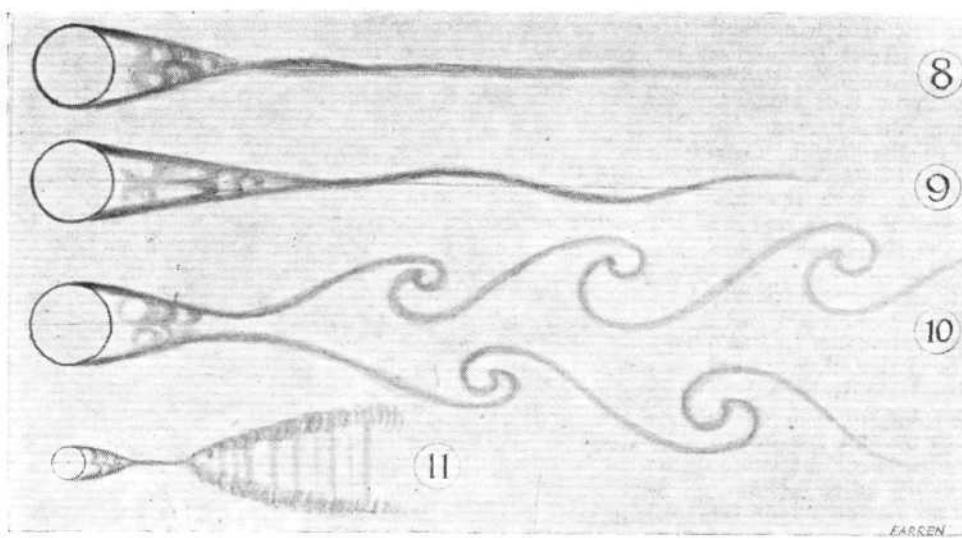
The nature of the "smoke" varied considerably according to the state of the titanium tetra-chloride. The best effects were produced when the liquid was fresh. If kept free from contact with the air, it would remain quite clean, but if air was present in any considerable quantity, solids began to form, which might be picked up by the glass rod. It was important to keep the end of the glass rod quite clean by wiping it every time it was withdrawn from the tunnel. A great deal of trouble could be saved by the judicious use of paraffin wax on all woodwork with which the liquid came in contact. Care should be taken to keep everything as dry as possible, since the reaction of titanium-tetra-chloride with water was extremely rapid and produced solid deposits which were very troublesome.

The Demonstrations

It is not, unfortunately, possible for us to convey in any adequate manner the fascination of actually watching the demonstrations which Mr. Farren gave. Phenomena with



FIGURES FROM MR. FARREN'S DEMONSTRATION: For explanation of these and following illustrations see text.



which one has been familiar, in a general and perhaps somewhat vague sort of way, for many many years took on a new significance, and became illuminatingly "real." A few days ago Mr. Farren was good enough to send us a number of pencil sketches illustrating some of the particularly interesting and novel features brought out by the demonstrations, and these we have re-drawn to make them suitable for publication. These figures do not by a long way represent all the things Mr. Farren showed at the lecture, but perhaps they may serve to give some slight idea of the instructive advantages of the smoke apparatus.

Referring to the sketches which Mr. Farren was kind enough to send us, Fig. 1 illustrates the demonstration of smooth flow past a cul-de-sac. By means of viscosity the main stream drives round an eddy in the "dead" region, and the smoke shows that there is a small amount of "mixing" of the two flows.

In the next illustration, Fig. 2, is seen the flow in a rapidly-expanding pipe. It will be seen that there is a breakaway or "stalling," and it has been observed that this is generally unsymmetrical.

Fig. 3 shows a "pipe" of constant cross-sectional area, but rapidly changing curvature of the boundaries. Such a pipe "flows full," suggesting that the breakaway shown in Fig. 2 is not due primarily to curvature.

The type of flow seen in front of a flat plate is illustrated in Fig. 4. This type of flow is closely similar to calculated "inviscid" flow, with a rapid rise of pressure along the stream near the centre of the upstream side.

Fig. 5 contrasts strongly with Fig. 4 in the type of flow produced. In this case there is a smooth flat plate along the stream as well as the flat plate of Fig. 4 at right angles to the stream. The behaviour of the air stream has quite changed. There is a rise of pressure along the stream due to the presence of the flat plate at right angles to the stream, and the boundary layer is rolled up into two large eddies.

In Fig. 6 is shown the breakaway of the flow past a circular cylinder. In the demonstration the formation of these eddies was clearly observable when the velocity of the airstream was changed suddenly.

Fig. 7 shows the same cylinder, but with a guard shielding the lower half, and with means for rotating the cylinder. We have here, of course, the Flettner rotor. Mr. Farren began with the cylinder stationary, when the streamlines had but a slight curvature, with an eddying region behind the cylinder, as in Fig. 6. He then started the cylinder rotating, and as the speed increased the streamlines bent closer and closer to the upper half of the cylinder until, at full speed, they followed the contour without breaking away. The movement of the cylinder's upper surface gave the boundary layer the necessary energy to prevent breakaway. The whole flow past the upper half was closely

similar to the calculated flow in the ideal or "inviscid" fluid of the mathematician.

Figs. 2 to 7, taken together, demonstrate that the origin of "stalling" or breakaway of the air flow lies in the slowing up of the boundary layer in the presence of a rise of pressure along the stream, and that it is not primarily due to the curvature of the surfaces.

The change of flow pattern with Reynolds Number is illustrated in Figs. 8 to 11. In Fig. 8 is seen a large cylinder rotating at low speed, and the flow is of the "viscous" type. In Fig. 9 the same large cylinder is running at higher speed, and the wake is showing signs of instability. The rotational speed is still higher in Fig. 10, and the wake is broken

up into a wave pattern. Fig. 11 shows a small cylinder running at high speed. The flow pattern is similar to that of Fig. 10, but the scale is reduced. This change in flow pattern occurs at Reynolds Number of about 100, i.e., a cylinder of $\frac{1}{8}$ in. diameter, with an air velocity of 1.5 ft./sec.

Initial stages of flow are shown in Figs. 12 and 13. For this demonstration Mr. Farren's throttle control of air velocity in the tunnel proved very useful, as he could accelerate and decelerate the rate of flow in almost an instant. Fig. 12 shows how eddies are formed at the edges of a flat plate whenever the flow is started or the speed changed suddenly. This should be compared with Fig. 4.

In Fig. 13 is seen how eddies are formed where a pipe suddenly enlarges. The faint lines show the subsequent motion, which is ultimately a "jet" passing through a comparatively still "dead" region, but gradually mixing with it in the downstream direction.

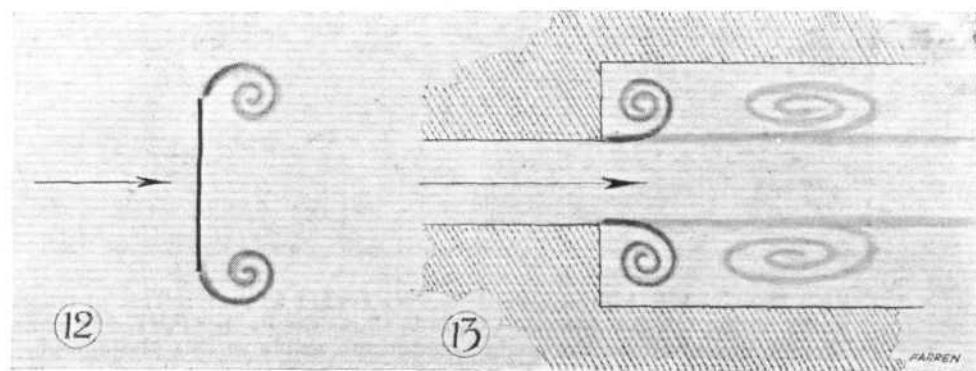
Flow past a Wing Tip.—Fig. 14 should help those who have not yet quite succeeded in obtaining a clear idea of the mechanism of induced drag. It will be observed that the streamlines do not flow across the wing in a direction parallel to the chord, but form angles with the wing chord. Under the wing the streamlines are deflected slightly outwards, while above the wing they are deflected inwards. At the actual wing tip a vortice is formed. The actual demonstration was highly successful in showing these features of the flow. This type of flow, of course, applies to a wing of finite span only.

The next figures, 15, 16 and 17, illustrate control of flow by removing the boundary layer by suction.

Fig. 15 may be assumed to represent an obstruction to air flow. For instance, it could be a section through a hill. The well-known phenomenon of an up-current in front of the hill is evident, and the "stalled" part may be the lee of the hill.

In the next illustration, Fig. 16, the boundary layer has been removed by suction, and now the air flow is seen to conform to the contour of the hill.

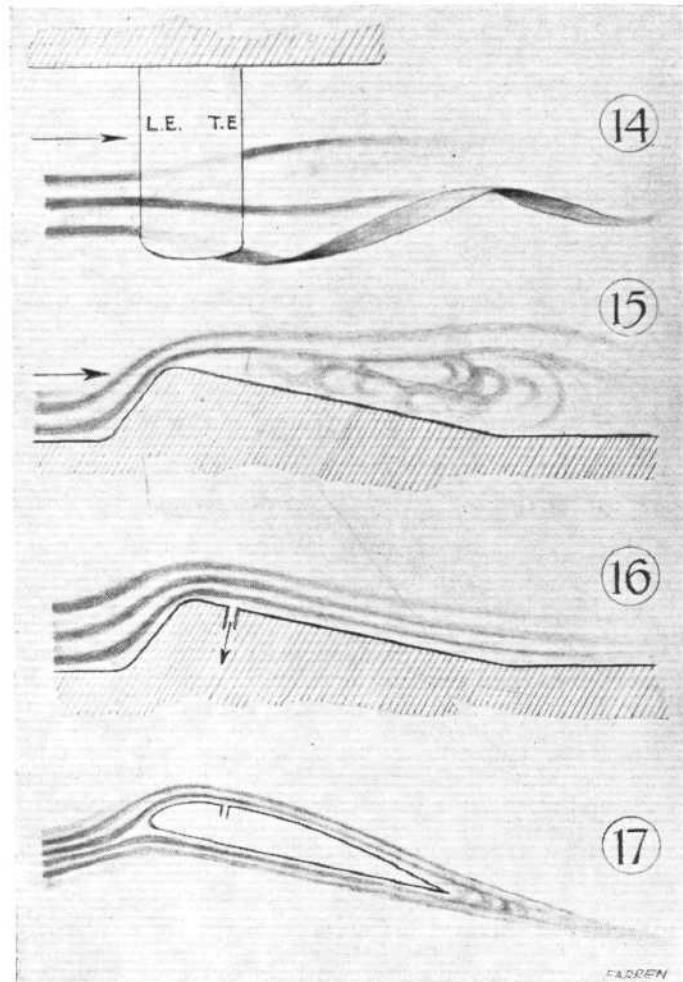
The last figure, No. 17, shows how the air flow past a wing at large incidence is made conformable by removing the boundary layer by sucking air through the opening near the highest point on the wing.



Mr. Farren also showed a model of a slotted wing, and those who have been a little in doubt about the action of the slot were able to see the flow change from turbulent to conformable as the auxiliary aerofoil or "slat" was brought into its proper position. Mr. Farren also was able to show that the position of the "slat" was important. With the "slat" in certain positions the slot had no effect, but as it was moved into place the flow gradually changed, following the aerofoil right to the trailing edge when the slot was of the shape which has now become familiar to everyone.

Some of Mr. Farren's demonstrations were extremely fascinating, although having no direct connection with aerofoils or fuselages. One in particular remains in one's memory. A model representing, in a two-dimensional way, a pipe with two very sharp bends in it helped to show admirably the eddying flow set up at such sharp bends. The air took the shortest path around the bends, failing to get into the corners on the outside of the bends, and forming distinct eddies in the lee of the other "bank." The lecturer then inserted narrow vanes, arranged in the fashion of venetian blinds, in the pipe, and the flow at once followed the contortions of the pipe in the most docile fashion, enabling the full cross-section of the pipe to be used instead of the constricted area utilised in the plain pipe. One imagines that, although this illustration was rather an extreme, much may be learnt from the smoke tunnel about such things as flow in induction pipes of engines.

To us it seems that Mr. Farren's introduction of the smoke apparatus into the lecture room may have considerable consequences. The ease with which types of air-flow can be shown to large audiences should, as Mr. Farren expresses it, help towards a more rapid spread of "air sense." This fact in itself should accelerate progress, because the greater the number of people who can "see" what the air is doing the more brains will be put to work on solving air problems. But in the aircraft factories also the apparatus may prove very valuable. If three-dimensional flow is not too difficult to see and show, the designer should be able to watch the effect of modifications, which could presumably be made quickly and cheaply by means of Plasticine. There would, at first, be no need for quantitative measurements of lift and drag. Experiments with smoke to reduce turbulence would form the first stage, and when this had been attained the model could be tested in the ordinary wind tunnel. If it should prove possible

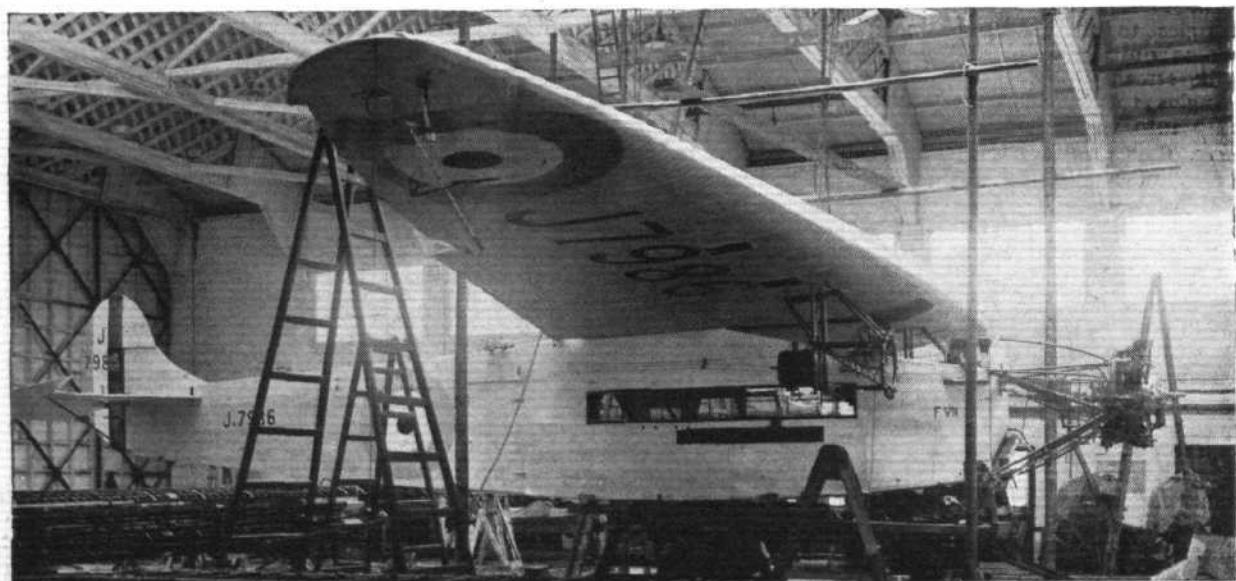


to test models large enough to incorporate running air-screws, much might be discovered about causes of interference between wing and fuselage, wing and outboard engine, and so forth.

R.A.F. Club and Xmas

THE Royal Air Force Club will be closed from 2.30 p.m. on Monday, December 28, until 12.30 p.m. on Tuesday, December 29 (for the purpose of holding the Annual

Staff Dance), except in so far as affects bedroom accommodation (with breakfasts only) to residents and members who have engaged bedrooms prior to noon on December 28. The Club will remain open during the Christmas holidays.



PUTTING THE MONOSPAR WING INTO PLACE: This photograph, taken at the Brockworth works of the Gloster Aircraft Co., Ltd., shows the Fokker F.VII-3M while the wing was being mounted. Weight was saved on the engine mountings visible in this photograph. This machine was tested in flight recently (see p. 1234).

The Industry

A Further Selection of Christmas Presents for Air-Minded People

WILLIAMSON MANUFACTURING CO., LTD.

A CHRISTMAS present should be attractive, useful and lasting. A camera fulfils all these requirements, and when, in addition, it is designed for air as well as ground use, the appeal it will make to those who travel by air will be a particularly strong one.

The ordinary hand camera is not suited for use from an aeroplane, because of its lack of rigidity, the necessity for holding and operating the camera in restricted quarters, and the need for accurate infinity focussing with a large-aperture lens.

The "Pistol" camera has been produced to meet these special requirements by a firm which has been engaged solely on the manufacture of aircraft cameras for the past 15 years, namely, The Williamson Manufacturing Co., Ltd., Litchfield Gardens, London, N.W.10.



The Williamson Pistol Camera.

The selection of a comparatively small picture size, viz., $2\frac{1}{4}$ by $3\frac{1}{4}$ in., was decided on by the firm mainly for the following reasons:—(a) Low cost of films and plates; (b) it rendered possible a small and light camera with a relatively long focus lens; (c) the attention paid by film manufacturers to this size means that the highest quality emulsion is available, rendering it possible to obtain negatives capable of many degrees of enlargement.

The body of the camera with the grip is constructed throughout of aluminium, with nickel-plated trigger, highly finished and treated generally with a hard, durable kryslac enamel. The standard lens supplied is a Ross Xpres of 5-in. focus with an aperture of F/4.5, sufficiently large to enable fully exposed photographs to be obtained at the maximum speed of the shutter, viz., 1/100th sec., either with or without a light filter.

The shutter, a sector type, is a high-grade ever-set pattern fitted between the lens combination and adjustable

for speed and aperture. A focussing mount and scale is supplied so that the camera can be used on the ground.

The back of the camera is fitted with runners and a clip fastening to take either plate holders, film pack adapter, roll film holder and focussing screen with hood. The plate holders, film pack adapter and roll film holder are in "the same register," i.e., no alteration is required for infinity focussing of the lens.

A brilliant view finder is fitted in a rigid tunnel on the top of the camera.

AEROPLANE ETCHINGS

DRY POINT etchings of aircraft are always acceptable to those who are interested in aircraft. Particularly fine are the range of those by Mr. Geoffrey Watson, published by The Fine Art Society, Ltd., 148, New Bond Street, London, W.1. The edition of each plate is limited to 50 impressions and the varied types of aircraft already published make it possible to choose something to suit everyone's taste.

SUITABLE FOR MOTORCAR MASCOTS

MODELS of aircraft may be used for many purposes, and Mr. L. Scragg, of 9, Hill Park Road, Torquay, has produced a very beautifully made little Vickers Supermarine S.6b. This is eminently suitable as a mascot for motor-cars, for which purpose it is being sold with a special attachment. Mr. Scragg is open to make similar models of any other aircraft for which there is a demand not only for decorating motor-cars, but also for use as souvenirs.

THE ENCYCLOPÆDIA BRITANNICA

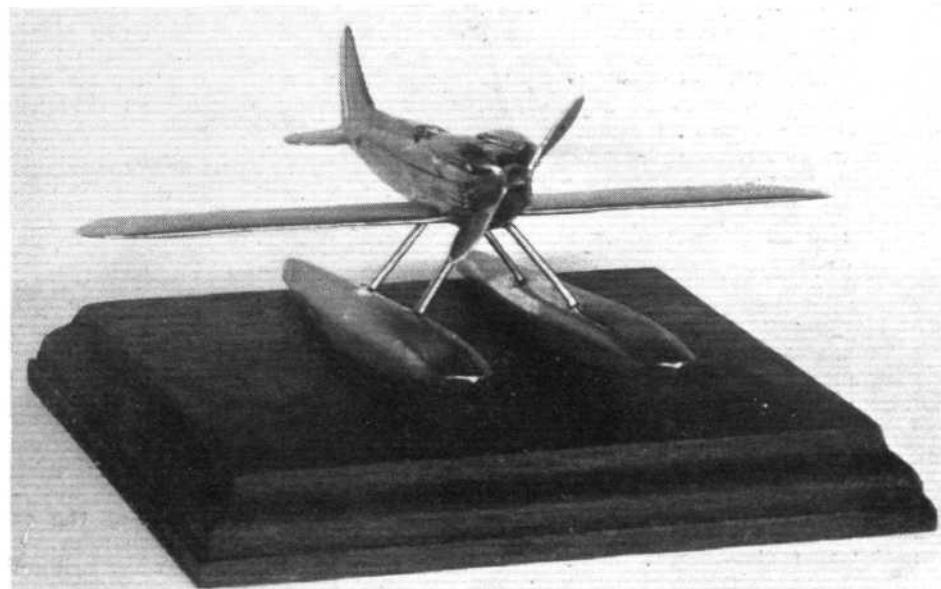
THE new edition of the *Encyclopædia Britannica* (14th) includes an extremely comprehensive and authoritative section on aviation and should be found of great use not only to the layman but also to the expert. Few well educated people can really afford to be without this exceptional work, and it is therefore with great pleasure that we hear that the price for the complete set of 24 volumes is for the time being reduced by 30 per cent. Encyclopædia Britannica, Imperial House, 86, Regent Street, London, W.1, have already sold over 80,000 sets, and at this time of year particularly, large numbers are being sent, not only to every English-speaking country in the world, but also to such widely-scattered countries as Scandinavia and Japan.

TRADE GREETINGS

BURCH'S, the R.A.F. tailors, of 33, Bedford Street, London, W.C.2, desire through our columns to convey their best Christmas and New Year wishes to all officers of the Royal Air Force, and to tender their thanks for all past favours.

FLYING MAPS

MAPS are always a most acceptable gift for any pilot and would-be givers should have no difficulty in finding something suitable from among the stocks of such people as the Automobile Association, Fanum House, London, W.1; Edward Stanford, Ltd., 12/14, Long Acre, London, W.C.2; or Raynor Maps, Ltd., High Holborn, London, W.C.2. Those of the waterproof kind are naturally best, and these may be had in a variety of easy-folding forms.



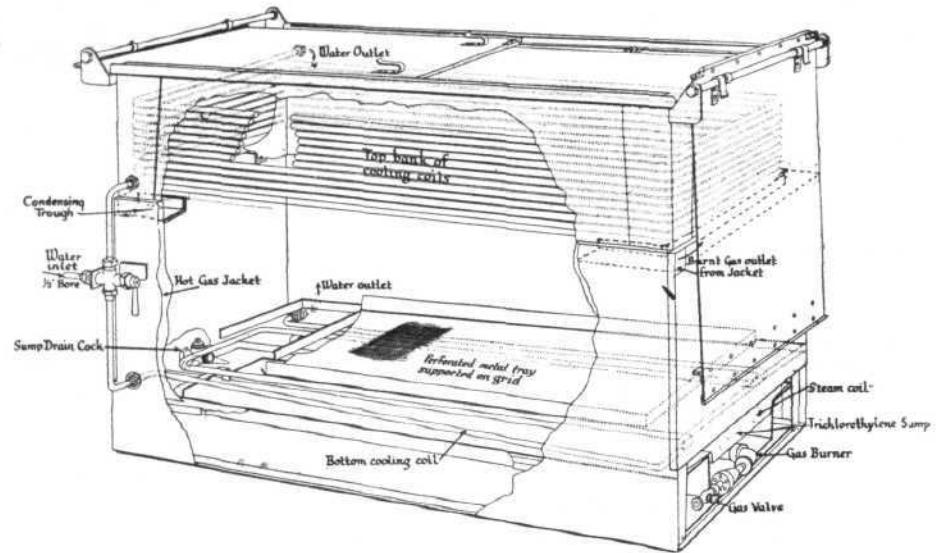
Mr. Scragg's model looks rather beautiful when mounted like this.

REMOVING THE GREASE

DEGREASING dirty engine parts or strip metal after "drawing" are operations necessary in every aircraft and aero engine works. In the former case it is necessary before such parts can be taken in hand for repair or overhaul, while in the latter case it is necessary for producing chemically clean surfaces prior to any finishing operation, such as parkerising, bonderising or enamelling. Similarly, for all small parts which have to be cadmium plated for rust prevention, adequate degreasing in such a plant is essential. These latter particularly, demand a surface absolutely free from the least trace of grease in the pores of the metal if the final result is to be a lasting and permanent finish.

The operation of removing grease can be performed in many ways, and until comparatively recently was done by brushing over, or otherwise applying some solvent, such as paraffin, which more often than not only helped to spread the grease and did not leave the article with a clean dry surface at the end. A far better method is incorporated in the I.C.I. Degreasing Plant, has the advantage that it does not attack any metal, leaves no deposit whatever, no secondary or subsequent operation is necessary, and has no fire risk nor any possibility of damage to health.

In this plant the solvent used which is most powerful, is Trichlorethylene. It operates at a low temperature, since its boiling point lies between 85 and 87 deg. C. This plant is made in two forms, wherein the solvent is used either (a) as a liquid or (b) as a vapour, and undoubtedly, from most points of view, the ideal method is its use as a vapour. This method has many advantages, chief of which is the fact that the work is immersed in the pure vapour only, and cannot therefore come in contact with grease previously removed from other work. The sketch shows the operation of the standard form of degreasing tank, but it should be realised that such a tank can be made in a multitude of forms, according to the particular job which it is required to tackle. In this standard form the solvent lies in a well at the base of the tank, and is raised to its boiling point by the application of heat, either in the form of a steam coil, an electrical element or a long gas burner beneath the tank. The vapour pro-



The I.C.I. Degreasing Plant Type D.

duced, which is nine times heavier than air, then rises in the tank until it reaches the upper portion of the walls, which are jacketed with cold water coils; here it condenses and, running down the walls, falls into a trough situated below the coils around the walls of the tank. The condensed solvent from this trough may then be drawn off and returned to the well in the bottom if required, or retained until it is desired to clean out the bottom of the tank.

Supposing for example the object to be degreased is a cylinder block. This block is lowered into the tank until it is completely immersed in the vapour, but is not actually touching the liquid below. The Trichlorethylene vapour immediately condenses on the cold surface of the block, and in doing so dissolves every particle of grease, which it then carries with it as it falls back into the well at the base. When the block itself is raised to the vapour temperature, it will be seen that condensation has finished, by which time no more grease is present on it, and on removal it will immediately dry off, presenting a dry, perfectly greaseless surface upon which any dirt (denuded of its grease) will remain in the form of a dry powder which may easily be brushed off, thereby making the article far more acceptable for repair from the point of view of the mechanic.

The grease which has fallen back into the well remains in solution in

the solvent, gradually raising its boiling point at a speed according to the amount of work passed through the tank. It is here that the continuous condensation and salving of the solvent is seen to be of great advantage, for by the time the boiling point in the well has risen to about 120 deg. C. the liquid will have very little more free solvent in it, and a thermostat is arranged to shut off the heat supplied. The oil may then be drawn off from a cock at the bottom, the tank cleaned out, and the clean condensed solvent returned so that the cycle of operations may be continued. In this method the loss of solvent is very small indeed, and where the work is heavy and has a relatively small surface, a consumption of over three tons of work per gallon of solvent can be obtained. Where the work is light with a large surface, naturally a smaller weight of parts will be degreased per gallon of solvent.

Sliding lids are fitted to the tank, which may be closed after the work has been immersed in the vapour, thereby still further tending to conserve the vapour and the solvent.

These degreasing plants are already in use at many aircraft manufacturers' works, but any interested who write to James W. Carr & Co., Ltd., 26, Budge Row, London, E.C.4, the South-Eastern agents for the I.C.I., mentioning FLIGHT, will gladly be sent further details applicable to their own particular problems.

CLOTHING FOR AIRMEN

SUITABLE CLOTHING for pilots is a matter which cannot be given too much thought, and the purchase of such should be made with very great care to ensure that such things as helmets, for example, fit perfectly; that goggles do not press upon the face in an uncomfortable manner; that Sidcot suits are not too long in the leg or too high at the back of the neck; that gloves, while at the same time being sufficiently loosely fitting on the fingers, do not have an unwieldy length of gauntlet. All such articles may be bought from S. Lewis, of 27, Carburton Street, London, W.1,

as well as everything else in the way of clothing and equipment.

AN OIL MERGER

COMPLETE fusion of two of the great oil distributing companies in this country, Shell-Mex, Ltd., and British Petroleum, Ltd., is taking place.

The sales organisation of the two companies will be operated from Shell Mex House, Kingsway, while Britannia House, Moorgate Street, E.C., until now the headquarters of all the B.P. activities in this country, will be devoted entirely to the heavy oils sales operations of the two companies.

Interchange of staffs is already completed for this purpose.

The formation of a private company, known as Shell Mex & B.P., Ltd., with a capital of £100 in £1 shares, was recently announced. This was created to ensure the closest co-operation between the two companies in their distributing businesses.

Each is a subsidiary company, B.P. of the Anglo-Persian Oil Company, and Shell-Mex of the Royal Dutch Shell Company, the two organisations having £74,000,000 of issued capital between them.

The British Government have a controlling interest in the Anglo-Persian group of companies.

A TRIBUTE TO ADVERTISING

A SALES record for the financial year just ended is announced by C. C. Wakefield & Co., Ltd., the all-British manufacturers of lubricating oils. Wakefields' have kept their supremacy by using British salesmen and British sales methods, and, above all, by placing their faith in Press advertising. In speaking of advertising, they say: "People have said in times of depression that they cannot afford to advertise. That is wrong. We cannot afford *not* to advertise. Our faith in Press advertising during the bad times we have come through has been justified by our increased sales. It is our experience that the public is paying more attention to advertisements. Buyers look to advertisements for guidance."

The fact that an all-British firm can create record sales during a period of intense depression is a tribute to British methods and British industry.

FOR THE GEAR DESIGNER

A BOOK which should be in the hands of all aircraft designers or aircraft works managers who have to design or operate any gears, gear-cutting machinery or worm drives, is the David Brown Hob Book. This small volume, which only costs 1s., can be obtained from David Brown & Sons, Ltd., Park Works, Lockwood, Huddersfield. It contains full particulars of over 2,000 hobs, both of the Standard Involute and D.B.S. patent forms, thus allowing designers to design worm gearing for which tools are already in existence, thereby effecting

a saving in time and cost. The section devoted to worm-gearing design is of particular interest, well illustrated, and contains all the necessary formulæ.

THE NATIONAL AIRCRAFT FACTORY

CONSIDERABLE prominence has been given in the daily Press to the fact that the National Aircraft Factory at Waddon has been disposed of by the Government and purchased by Town Investments, Ltd.

As A.D.C. Aircraft, Ltd., and Cirrus Aero-Engines, Ltd., at one time occupied these premises, it is felt that possibly it may not be understood that the sheds now occupied by the Cirrus-Hermes Engineering Co. facing on to Croydon Aerodrome do not come within this sale, as they are the property of the Air Ministry and are leased direct.

This sale of the National Aircraft Factory does not, therefore, in any way involve the Cirrus-Hermes Engineering Co., nor will it mean any alteration to business.

ANGLO'S BRITISH BOARD

THE ANGLO-AMERICAN Oil Co., Ltd., announce the appointment of Mr. Frederick J. Wolfe to the chairmanship of the Board of Directors, and the addition of Mr. J. B. R. Morton to the Board. The Company has an all-British board, comprising the above gentlemen and Mr. James Hamilton, Vice-Chairman, Mr. J. Wilkie Frye, and Mr. A. Maclean.

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information, technical and general, for its size. We cannot here mention the information given in the diary, and can only suggest that the reader obtains a copy and gives its usefulness a test—we do not think he will regret it. The price of this diary varies from 2s. to 7s. 6d., according to binding, etc., and it may be added in conclusion that 10 per cent. of the cost price of all copies sold will be handed over to the Royal Aeronautical Society Endowment Fund.

A WESTLAND SOCIAL

THE WESTLAND AIRCRAFT Works, Yeovil, held their annual social on Saturday, November 28, at the Assembly Rooms, Yeovil, when some 250 staff and employees assembled to enjoy an evening of dancing, interspersed with choral items.

Mr. R. A. Bruce, managing director, mentioned in his opening remarks that this particular social was to celebrate the completion and delivery of the 500th Wapiti, and he thought it was an achievement of which to be proud in that their machines had proved their worth to such an extent that the Air Ministry had ordered so many of one type. Wapitis were used, he said, in the R.A.F., in the Royal Australian Air Force, and also the South African Air Force. There were some 20 squadrons of the R.A.F. equipped with these aircraft, the proportion being higher than that of any other make.

The Ambassadors Dance Band and Miss Ursula Priddle (accompanist) provided the musical portion of the programme, while the choral items were well rendered by certain talented members of the staff.

A VICKERS' RESIGNATION

A ITEM of news is the resignation of Air Com. J. A. Chamier, C.B., C.M.G., D.S.O., O.B.E., from Vickers (Aviation) Ltd., and from the Supermarine Aviation Works (Vickers), Ltd. Air Com. Chamier previously held a seat on the Board of Directors of each of these Companies.



THE LATEST CURTISS-WRIGHT "JUNIOR": In our issue for Feb. 27 last we illustrated and briefly described the Curtiss-Wright "Junior" light plane. Above we show this machine developed into an amphibian—and it will be seen that the machine has altered but little in general appearance.

CANAL SURVEYING FROM THE AIR

THE use to which aeroplanes can be put to assist land survey work was successfully proved on June 1 this year, when the Directors of a Canal in the East Midlands employed a Westland "Wessex" 3-engined monoplane for this purpose. The idea originated from the fact that Mr. Harold Peake, a Director of the Sheffield and South Yorkshire Navigation Company, had on many occasions made use of his private light aeroplane to visit the less accessible lengths of the waterway and to keep in touch with the progress of work, and it was in order to enable the other Directors of the Company, together with the General Manager, to examine the canal development schemes that the use of a larger machine was suggested. The "Wessex," with its three engines, its reliability, speed and accommodation, together with a clear and unrestricted view and general comfort, was considered to be particularly suitable for the work.

The monoplane type is very well adapted for such survey owing to the excellence of the downward view. Through the kindness of the Westland Aircraft Works, Yeovil, the demonstration Wessex was placed at Mr. Peake's disposal.

To suit the convenience of some of the Directors, and with the consent of Sq.-Ld. Anderson, the Commanding Officer of the R.A.F. Aerodrome at Hucknall, it was arranged that the flight should start from and terminate at this point. The machine, which had taken part in the Sherburn Meeting on May 30, arrived at the pre-arranged time, with Mr. C. Byron, Sales Manager of Westland Aircraft Works, and the pilot, Mr. F. J. Brunton, who reported that the weather was very heavy over Sheffield, although at Hucknall there was a clear sky and brilliant sunshine.

After the minimum of delay for discussion of the route, etc., the party embarked and the flight started, the route followed being from Hucknall to Sheffield, where the Canal was picked up and followed throughout its course to the River Trent. The course followed the River Trent to the Trent Falls and from there down the Humber to the site of the proposed new Humber Road Bridge, the scheme for which is now before Parliament. From there the route

was up the Humber and along the River Ouse to Goole, where it again followed the course of another canal over several miles, the original route was crossed near Doncaster. From this point the return journey was made to Hucknall Aerodrome.

It was perhaps fortunate, from the point of view of testing the Wessex, that the weather was exceptionally bad, for almost immediately after leaving the Aerodrome the machine flew into the edge of a severe thunderstorm, and, although the pilot avoided the worst of the storm and skirted round it as far as possible, it was not possible to avoid it altogether, owing to the necessity of following a definite line of route.

It was not surprising, therefore, that there was, to start with, a certain amount of "bumping," but the bumps were much less than one would have expected, and no inconvenience or discomfort was caused. The machine undoubtedly is very stable in such rough weather conditions, far more so than light planes, and is, therefore, to be recommended to those who wish to fly but dislike the idea of the lightly loaded and cramped "Sports" machine.

The passengers were able to move about in the Wessex, from side to side, to look out of alternate windows, and one of the passengers, who was in the air for the first time, stated afterwards that he was surprised at the steadiness of the machine, which he said compared very favourably with the rear seat of even the most comfortable motor car over good roads. With the three engines, not only was there no cause for apprehension with regard to safety, even under the worst conditions, but the Wessex could be brought down to comparatively low altitudes for observation. The easy handling of the machine enabled small bends to be followed so that the objective was always in view, and to get a larger "map" of the country, a rapid rise to a higher altitude could be made when required.

The Wessex used was of a type similar to those owned by Sabena Air Lines and used by them on their Continental and cross-Channel air routes. However, the machine was equipped with three 7-cylinder Armstrong-Siddeley

Genet Major engines, giving a total H.P. of 447 instead of the 330 H.P. of the smaller 5-cylinder Genet. In this form the Wessex has an even better performance than before, and the top speed has been increased from 108 m.p.h. to 118 m.p.h., and this at the expense of a petrol consumption increased by only $6\frac{1}{4}$ gall./hour. The ceiling has been increased from 12,300 to 14,900 ft., whilst it is possible to maintain height on any two engines up to 6,000 ft.

In addition to the accommodation for the pilot and navigator, very comfortable seats are arranged on each side of the cabin, commanding an uninterrupted view over a large tract of country. Easy communication exists between those in the cabin and in the cockpit, and there is ample room for the study of maps, etc. The provision of three engines eliminates the risks attached to engine failure at low altitudes.

The actual flight was carried out under exceptionally adverse conditions, but no criticism could be made of the performance of the machine, apart from noise, which is fairly general in aircraft at the present time.

There is one advantage of survey from the air as compared with any other means which is



Directors of the Sheffield and South Yorkshire Navigation Co. preparing for their survey flight in a Westland "Wessex" over their canal area. The group includes Mr. C. Byron (left) and Mr. F. J. Brunton, pilot (fourth from left) of Westland Aircraft.



The Westland "Wessex" Limousine used by Mr. Harold Peake for canal survey work in the East Midlands.

outstanding, and that is that one is able to reduce the overall time of the survey to the lowest possible, while being able to concentrate attention on particular points without undue haste; for, paradoxical though it may seem, although the speed of the machine may be as high as 118 miles an hour, as it was in this case, the actual rate of passing over a particular point seems to be slow, because one has such a wide range from which observation can be taken, and it is only after covering definite distances that one realises the amount of ground covered in a very short time.

Anyone with flying experience will need no description of the ease with which canals, rivers, etc., could be picked out and followed up, while even those who have never flown, but who have seen wartime photographs of trench systems, etc., can imagine for themselves the unique advantages of a bird's-eye view. For instance, when passing over Trent Falls, the new training walls, which are being built in the River to improve the channel for navigation at the junction of the Trent and Ouse, showed up clearly,

so that one could not help admiring the lines on which they had been laid out. While, in the Humber, not only the various channels and sandbanks were clearly defined, but the silt in suspension, moving with the current in some places and nearly stationary in others, could be seen quite plainly.

In no other way but from the air could these observations possibly be made. It is surprising that more use has not already been made in this country of air survey work. One cannot help thinking that it would be well worth while for engineers and others engaged in planning large schemes of construction work to charter an aeroplane for a general survey of the ground beforehand; while during construction an occasional flight would follow up the progress of the work from time to time.

Having seen the advantages of this in connection with waterways, one can readily imagine the great use for large schemes of road construction, and particularly for new main arterial roads. In the selection of factory building sites, also, the time might be well spent.



A British Aircraft Register

THE British Corporation Register of Shipping and Aircraft are shortly issuing a register of British aircraft in card-index form. The first issue will contain more than 1,070 aircraft, and these indexes are being issued at a price of £2 2s. each. The purchaser will, without further payment, receive fortnightly amendments issued in the form of cards, which can easily be inserted in their proper places. Classification will be according to the identification letters on the machines, but it will be an easy matter for purchasers to rearrange this according to their own requirements. The information on the cards will be considerable, and will include not only the owners' name, but the type, engine and home station of the aircraft, as well as full information about its certificate of airworthiness, the date thereon and when it was last surveyed, etc. The British Corporation Register also undertakes quarterly inspection of aircraft and has reciprocal arrangements with foreign authorities which ensure that the aircraft owner when travelling abroad can obtain competent technical assistance in case of need. The foreign organisation with whom such arrangements have been made are:—The American Bureau of Shipping, Bureau Veritas, Germanischer Lloyd, Imperial Japanese Marine Corporation, Det Norske Veritas and Registro Italiano.

London Chamber of Commerce (Aviation Section) Chairman

AT the annual meeting of the Civil Aviation Section of the London Chamber of Commerce on December 9, Capt. P. D. Acland was appointed Chairman of the Section to succeed Col. the Master of Sempill on completion of his year of office in that capacity. Mr. Alan S. Butler and Sir Robert McLean were re-elected Deputy Chairmen.

Transport in Miniature

AT the forthcoming Models Exhibition, which is being held in Dorland Hall, Regent Street, S.W.1, from January 6 to 23, transport in all its forms will be represented by an extensive collection of models. The aviation section will be a comprehensive one, and will include the following. A model of the Schneider Trophy Winner is being displayed by Vickers-Armstrong, Ltd., whose subsidiary company built, at the Supermarine Works, Woolston, the seaplanes which have won this international race in 1927, 1929 and the present year, and so secured the trophy for

Great Britain permanently. The Blackburn Aeroplane & Motor Company, of Brough, are showing a 3-ft. model of the "Nile" triple-engined monoplane flying-boat; and A. V. Roe & Co., of Newton Heath, the results of their work in aircraft construction over more than two decades. The Cierva Autogiro Co., Ltd., are exhibiting models of the latest aeroplanes developed on the novel lines invented by the well-known Spanish engineer, Senor Don Juan de la Cierva. Among the providers of regular air transport services, both Imperial Airways, Ltd., and the French Air Union are represented. Imperial Airways propose reviewing in model form their machines on various routes of such widely separated types as the tropical sections of their Indian and African services, the European heavy-traffic lines, and the connecting links across the Mediterranean. A Hannibal-type liner will also be shown in section. Modern ground organisation will be represented by Sir Alan J. Cobham's diagrams for airports at Liverpool and Doncaster.

Parliament and Imperial Airways

QUESTION in the House of Commons on December 11 elicited from the Under-Secretary of State for Air the following details about Imperial Airways, Ltd. The terms on which the agreement for the Indian service was negotiated included the free transfer to the company of two "Calcutta" flying-boats. Further, when it was arranged that the sea mileage on the Indian route should be extended, it was decided to make a capital grant to the company of £20,000 towards the cost of the first new flying-boat of the increased fleet. In respect of subsidies for the England-Egypt service, the following table was published:—

	1928-29	1929-30	1930-31
Subsidy earned	£ Nil	£ 88,750	£ 95,565
Subsidy paid	Nil	80,000	98,750
Unearned balance held ..	Nil	Nil	Nil

AIR MINISTRY NOTICES

AIR MINISTRY NOTICES TO AIRMEN, SERIES A

No. 64 of the year 1931. Pilots' Log Books : Method of Recording Flights when Two Pilots are Employed. (912678/29)

Whenever two pilots divide the duty of piloting an aircraft during a flight, the full time of the flight should be entered in both pilots' log books (C.A. Form 24) and against each entry a note should be inserted in the "Remarks" column to indicate the time that the pilot to whom the log book belongs was actually engaged in piloting the aircraft.

November 23, 1931.

No. 65 of the year 1931. Civil Air Maps of Great Britain. (870838/28)

The following is a complete list of the civil air maps of Great Britain at present published:—

(i) *The Ordnance Survey 10-Mile Map of Great Britain (Special Air Edition) in three sheets, price 5s. (paper flat) and 6s. (linen-backed folded) per sheet.*

This map, printed in colours, is produced on a scale of 1 in. to 10 statute miles (1 : 633,600). Topographical relief is shown by layers in brown, with contour lines. The positions of aerodromes, landing grounds, seaplane stations, airship stations, air navigation lights, prohibited areas and danger areas, are shown in red or blue.

The approximate areas covered by the sheets are:—

Sheet 1.—That portion of Scotland lying N. of lat. 55° 40' N.

Sheet 2.—S. Scotland, N. England, Midlands and N. Wales, between lat. 56° 30' N. and lat. 52° 45' N.

Sheet 3.—Wales, Midlands and S. England, S. of lat. 53° 37' N.

(ii) *The 1-in. Ordnance Survey Map of England and Wales (Civil Air Edition) in 12 sheets, price 2s. 6d. (paper flat) and 3s. 6d. (linen-backed folded) per sheet.* This map, printed in colours, is produced on a scale of 1-in. to one statute mile (1 : 253,440). Topographical relief is shown by layers in brown, with contour lines at 200 ft. vertical intervals. The positions of aerodromes, landing grounds, seaplane stations, airship stations, air navigation lights, official air routes, prominent landmarks, ground signs, D/F stations, prohibited areas, danger areas, high W/T masts, etc., are shown in red.

(iii) *The 1-in. Ordnance Survey Map of Scotland (Civil Air Edition) in 10 sheets, price 2s. 6d. (paper flat) and 3s. 6d. (linen-backed folded) per sheet.*

This map is similar in character to the map of England and Wales described at (ii) above. Sheet 1, which covers the Border district, is identical with Sheet 1 of the England and Wales series.

November 24, 1931.

No. 66 of the year 1931. Class "B" Pilots' Licences : Night Flying Test. (112837/31)

As from January 1, 1932, until further notice, the night-flying test referred to in paragraph 94 (1) (f) of the Air Navigation Directions, 1930 (A.N.D. 10), will be made from Croydon to Lympne or from Lympne to Croydon, instead of from Croydon to Penshurst as at present.

All normal lighting equipment on the airway between Croydon and the coast will be put into operation for these flights. In addition, paraffin flares in T formation will be lit at Penshurst and Marden landing grounds in order that landings can be made at those places in emergency.

November 26, 1931.

No. 68 of 1931. Examination for Civil Air Navigators' Licences. (141391/31)

An examination for 1st Class and 2nd Class Air Navigators' Licences will be held in London on Monday, Tuesday, Wednesday and Thursday, March 14, 15, 16 and 17, 1932.

London.

Heliopolis (The Office of the British Civil Aviation Directorate Representative in Egypt, Heliopolis Aerodrome).

Baghdad. (Hinai'di aerodrome.)

Application forms, the syllabi and conditions of examination may be obtained on application to the Secretary, Air Ministry (C.A.2), Gwydyr House, Whitehall, London, S.W.1, or to the British Civil Aviation Directorate Representative in Egypt, Heliopolis Aerodrome, Heliopolis, Egypt, or the Air Officer Commanding, Royal Air Force, Air Headquarters, Hinai'di, Iraq.

Formal applications for permission to attend these examinations must be made on form C.A.2.c., and together with the prescribed fees must have been received at the appropriate address not later than Monday, February 15, 1932. In no circumstances can late applications be considered.

Before a licence can be issued, candidates must pass the prescribed medical examination, for which special arrangements will be made where necessary.

Copies of the papers set at previous examinations for 2nd Class Air Navigators' Licences may be obtained from His Majesty's Stationery Office, Adastral House, Kingsway, London, W.C.2, as follow:—

Papers set at the six examinations held in October, 1930, July, 1930, March, 1930, October, 1929, December, 1928, and April, 1928, bound in one volume, price 2s. net, or post free 2s. 4d. net.

Papers set at the examination held in March-April, 1931, price 6d. net, or post free 8d. net.

Papers set at the examination held in October, 1931, will be placed on sale shortly, price 6d. net, or post free 8d. net.

Copies of the papers set at previous examinations for 1st Class Air Navigators' Licences may be obtained free of charge on application to the Secretary, Air Ministry (C.A.4), Gwydyr House, Whitehall, London, S.W.1.

A further examination for 2nd Class Air Navigators' Licences will be held at or about the beginning of October, 1932. December 7, 1931.

No. 69 of 1931. Flights Across the Strait of Dover : Arrangements for Reporting and Search. (47449/30.) (Special)

With reference to N/A. Series A, No. 6 of 1931, pending the installation of the signalling panel at Alprech, a lamp is available for the acknowledgment of circuits made by aircraft.

The signal of acknowledgment will be the flashing of a white light from a position to S. of the semaphore station. December 8, 1931.

AIR MINISTRY NOTICES TO GROUND ENGINEERS

No. 72 of the year 1931. Examination of Applicants for Ground Engineers' Licences or Extensions to the Scope of Existing Licences. (33611/30)

Examination boards will sit for the purpose of examining applicants for ground engineers' licences at the following times and places:—

(a) London, on the first, second, third, and fourth Wednesdays in every month.

(b) Croydon, on the second and fourth Fridays in every month.

(c) Manchester, on the first Wednesday in January, March, and May.

(d) Bristol, on the first Wednesday in February, April, and June.

Applications for licences should be made on the appropriate form, which is obtainable on request, and should be addressed to The Secretary, Air Ministry (C.A.2), Adastral House, Kingsway, London, W.C.2. Applications for extensions to existing licences will also be dealt with at these boards, and such applications should be sent by letter to the address given above, giving particulars of recent experience in respect of the extension required together

with the fee of 5s., and stating the centre at which the applicant wishes to sit.

Applications for examination at the centres named at (1) (c) and (d) above can only be accepted provided that the application is received 14 days before the dates specified and provided also that the total number of applications received is within the capacity of the board. Applicants whose applications are not accepted owing to these provisions will be given the opportunity either for early examination at London or Croydon or, alternatively, to be placed on a waiting list for the next board to be arranged in the particular place concerned.

November 21, 1931.

No. 73 of the year 1931. Avro "Avian" : All Types. (60361/30)

The forward movement of the control sticks is limited by the operating lever on the elevator striking the rearmost cross tube of the fuselage at the stern-post in the case of metal "Avians." On wooden Avians with the rear stick removed, the bottom edge of the elevator spar forms the stop.

A modification incorporating a check cable attached to the fuselage frame and the elevator rocking lever has, accordingly, been introduced in order to provide a definite stop to the control sticks.

Copies of these "Avian" Modifications, No. 103 (Metal Fuselage) and No. 104 (Wooden Fuselage), may be obtained from Messrs. A. V. Roe and Co., Ltd., Newton Heath, Manchester.

The certificate of airworthiness of an aircraft affected by this modification shall be liable to suspension or cancellation if the above modification has not been incorporated within six months from the date of this notice. Certificates of airworthiness will not be renewed, and ground engineers must not sign daily certificates for such aircraft after the expiration of the aforementioned period unless the modification has been correctly embodied.

November 24, 1931.

No. 74 of the year 1931. Wing-Tip Flares on Civil Aircraft. (60361/30)

It is hereby notified that:—

The fitting of wing-tip flares to civil aircraft for which a certificate of airworthiness has been granted or is required, constitutes a modification, in respect of which the usual application must be made to the Secretary (C.A.2), Air Ministry, Adastral House, Kingsway, W.C.2, and full particulars of the proposed installation must be forwarded to the Airworthiness Department, Royal Aircraft Establishment, Farnborough, in accordance with paragraphs 33 and 34 of A.N.D. 10.

Particulars of all existing installations of wing-tip flares are to be submitted to the Airworthiness Department, R.A.E., forthwith, giving details of the following items:—

- (a) Type of flare bracket.
- (b) Method of attachment of bracket to plane.
- (c) Type and size of cables.
- (d) Type of press button.
- (e) Type of master switch.

The certificate of airworthiness of any aircraft affected shall be liable to suspension or cancellation if approval of such wing-tip flare installations has not been obtained within three months from the date of this notice. Certificates of airworthiness will not be renewed or new certificates of airworthiness granted for aircraft fitted with wing-tip flares unless and until the installation of such equipment has been approved.

November 26, 1931.

No. 75 of the year 1931. "Gipsy I" Engines : Replacement of Connecting Rods. (146466/31)

"Gipsy I" engines prior to No. 1007 were originally fitted with connecting rods (Part No. 800-10) having two holes drilled in the underside of the small end which converge into one hole where they enter the gudgeon-pin bore.

It has been found by experience that cracks are liable to develop at the point where these holes meet, and as a consequence the maximum safe life of these rods has been fixed at 600 hr.

In rods of later manufacture the holes in question are approximately 11 mm. apart where they enter the gudgeon-pin bore.

Early-type rods should normally be replaced by those of later manufacture referred to in paragraph (3) on the occasion of the first complete overhaul. In the case of engines which have already been overhauled the rods should be replaced on the completion of 600 hours' running, or alternatively, where evidence of the time run is not available, they should be replaced within two years of the date of the engine being put into service. Rods which have already completed 600 hours' running, or have been in service for more than two years, as the case may be, should be replaced immediately.

Certificates of airworthiness will not be issued or renewed in respect of aircraft fitted with engines not complying with these requirements.

November 28, 1931.

No. 76 of the year 1931. Jaguar Engines. A.V.T. 70, 70 E and 70 G Carburettors : Needle Valve and Float, Sticking of. (123150/31)

Attention is drawn to Jaguar Modification No. 478 covering an alteration to the needle valve seating and the addition of a bracket to the float lever of the A.V.T. type carburettors fitted to Jaguar engines. The changes have been effected in order to minimize the risk of the needle valve sticking in the closed position.

The bracket, Part No. C.H. 13695, is bifurcated to fit over the neck, or smallest diameter, of the needle valve, and is attached to the upper face of the float lever by a 4 B.A. screw, A.G.S. 246, locked by lightly riveting over the projecting end of the threaded portion.

To accommodate the bracket, the needle valve seating must be shortened at the guide end by 9 m.m., the circlip, Part No. C.H. 13666, being rendered redundant. Care must be taken to ensure that:—

- (a) Burrs are removed.
- (b) The seating is not distorted during the work of modification and assembly.
- (c) The seating is properly locked into the body.
- (d) The clearance between the guide portion of the seating and the needle valve, permits a narrow 0.0015-in. feeler to be inserted.

It is necessary to turn the carburettor upside down when engaging the modified float lever with the needle valve.

When re-assembling the float chamber, a check must be made to ensure that there is at least 1-in. clearance between the float chamber and the sides of the float at all positions in the swing of the float. Where the clearance is insufficient, minor irregularities in the casting should be removed and/or the transverse position of the float adjusted by means of a thin brass washer fitted to the fulcrum pin.

The alteration and addition required by this Notice must be effected at the next overhaul. All future issues of carburettors supplied with engines, or as spares, will have the modification incorporated.

The engine log book should be endorsed to show:—

- (a) That the modification has been incorporated.
- (b) That the checking required by paragraph (4) of this Notice has been carried out.

(December 9, 1931.)

THE ROYAL AIR FORCE

London Gazette, December 8, 1931.

The Rev. Sidney Lampard Clarke, M.A., B.Sc., Chaplain-in-Chief, R.A.F., is appointed an Hon. Chaplain to the King (Nov. 26).

General Duties Branch

Lt.-Cdr. Edgar William Edmond Lane, R.N., is re-attached to R.A.F. as Flying Officer with effect from Nov. 24, and with seniority of Jan. 12, 1925. The follg. Pilot Officers on probation are confirmed in rank:—Richard Thomas Showler Morris (Oct. 16); Bernard Adolf Casey, Edward Ridley Short Johnston, Kenneth Lea-Cox, Hugh Whittall Marlow, Alfred Hardwicke Marsack, William Pickersgill, Harry Lumsden Tancred, James Rawlinson Wemyss, Eric William Whitley, Frederick William Yates (Dec. 5).

The follg. Pilot Officers are promoted to the rank of Flying Officer:—Robert Archie Byrne, Richard James Robert Haldane Makgill, Henry Augustus Simmons (Oct. 13). Squadron Leader Meredith Thomas, D.F.C., A.F.C., is placed on half-pay list, scale A (Dec. 7); the permanent commn. of Pilot Officer Wallace Richards is terminated on cessation of duty (Dec. 9).

Stores Branch

Flight-Lieut. Ernest Alfred Tottle is placed on retired list (Dec. 8).

Medical Branch

Flying Officer William Joseph Cotter, M.B., B.Ch., is promoted to rank of Flight-Lieut. (Nov. 26).

Memorandum

181703 Flight Cadet Robert Cecil Wainwright is granted an hon. commn. as a Sec. Lt. with effect from the date of demobilisation.

RESERVE OF AIR FORCE OFFICERS

General Duties Branch

The following Pilot Officers are promoted to rank of Flying Officer:—Eric Harold Buxton (June 16), Richard Edwards (Oct. 1), George Bertram 3.11.31.

ROYAL AIR FORCE INTELLIGENCE

Appointments.—The following appointments in the Royal Air Force are notified:—

General Duties Branch

Wing Commander E. H. Johnston, C.V.O., O.B.E., D.F.C., to R.A.F. Depot, Uxbridge, on completion of duty as Air Attaché, Buenos Aires, 3.11.31.

Squadron Leader C. St. Noble, to R.A.F. Depot, Uxbridge, 17.11.31.

Flight-Lieutenants: G. Bowen, to R.A.F. Depot, Uxbridge, 30.10.31; A. W. Franklyn, M.C., to Station H.Q., Andover, 1.12.31. F. S. O'Hanlon, to No. 100, Sqdn., Donibristle, 20.11.31. R. R. Greenlaw, M.B.E., to No. 35

Shields (Oct. 7), Peter Richard Nickols (Oct. 8), Henry Enfield Reekie (Oct. 9) James Herbert Thompson (Oct. 23), Nicolas Joseph Tindal (Oct. 29), Christopher Mackinnon Scrutton (Nov. 4), Alan Moncrieff MacLachlan, Richard Whitelegge O'Sullivan (Nov. 5), Kenneth Roy Boulton (Nov. 6), Ivan Rutherford Scott (Nov. 12), John Howard Gladstone (Nov. 19).

Flying Officer Clifford Hole is transferred from Class B to Class C (Sept. 18). The following Flying Officers relinquish their commns. on completion of service:—Augustus Alfred Ward Barron (Oct. 24), Richard Slade Walter (Nov. 24). Flying Officer Ian Grant Gibson Edgar relinquishes his commn. on completion of service, and is permitted to retain his rank (Sept. 26). Flying Officer William Edward Gray is removed from the Service (Dec. 9).

Stores Branch

Squadron Leader Thomas Grove Gordon, M.B.E., relinquishes his commn. on completion of service, and is permitted to retain his rank (June 17).

Accountant Branch

Flying Officer John Alfred Coleman relinquishes his commn. on completion of service (Sept. 1).

SPECIAL RESERVE

General Duties Branch

Pilot Officer on probation Michael Dawnay is confirmed in rank (Oct. 25).

AUXILIARY AIR FORCE

General Duties Branch

No. 604 (COUNTY OF MIDDLESEX) (BOMBER) SQUADRON. Pilot Officer Abraham Eyre Chatterton to be Flying Officer (Sept. 19).

Medical Branch

No. 600 (CITY OF LONDON) (BOMBER) SQUADRON.—Flight-Lieut. Norman Percy Henderson, M.D., Ch.B., relinquishes his commn. on completion of service (Apr. 6).

Stores Branch

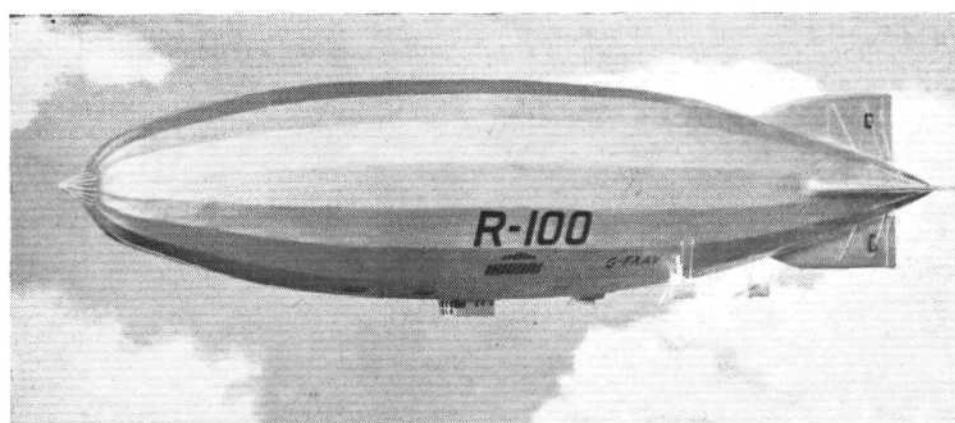
Flight-Lieutenant H. E. T. Crocker, to Station H.Q., North Weald, 3.12.31.

Chaplains Branch

Rev. J. F. Cox, M.C., to R.A.F. Depot, Uxbridge, 8.11.31.

THREE INTERESTING MODELS

These three models, made by the Models Mfg. Co., of Newington Causeway, S.E.1, show the airship R. 100, the "Gipsy I" engine and the 1906 Wright biplane. The airship model in 3 ft. overall in length, while the "Gipsy I" engine is 4 in. high 2½ in. wide and 4½ in. long.



R.A.F. SPORT

BOXING

The Lord Wakefield Novices Team Boxing Championships
(From a CORRESPONDENT)

THE Wakefield Championships were fought off at Henlow on Wednesday and Thursday, December 2 and 3, and proved more popular than ever. Wednesday's programme consisted of 120 eliminating fights, leaving only the finals for Thursday evening.

Amongst the ringsiders on the final night, could be seen Major General Sir Percy Cox, Air Marshal Sir E. Ellington, Air Vice-Marshal Borton, Air Vice-Marshal Bowhill and Air Commodore MacEwen, whilst Fred May appeared to be extremely busy caricaturing the spectators and contestants from the Press Stand.

One of the best fights of the evening was provided by A. A. Purdie (Halton "B") and A. C. Totton (Uxbridge). Totton has all the makings of a champion, and was rather unlucky not to get the verdict.

It would also not be surprising to see F/O. Bufton, of Henlow, showing up prominently when the R.A.F. Championships take place in a few months' time; he won his three fights in masterly style, and although his opponent in the final—F.O. Streatfield, of Upavon—had the advantage of height and reach, Bufton would not be repelled and outboxed his opponent for the verdict.

The Halton teams, as a whole, reflected great credit on their trainers, L.A.A. Croce and AA. Tubbs deserving special mention for their excellent victories over older men.

Details of Final Results

Junior Flyweight

AC. Smith, Calshot, outpointed AC. Purchase, Duxford, comfortably.

Junior Bantam Weight

AC. Brannon, Calshot, beat AC. Clinch, Felixstowe, on points.

Junior Feather Weight

AC. Skinner, Eastchurch, outpointed AC. Thompson, Felixstowe.

Junior Light Weight

AC. Duddle, Sealand, gained a points verdict over AC. Brown, Gosport, in a good fight.

Junior Welter Weight

AC. Hall, Sealand, beat AC. Rowe, North Weald, on points.

Junior Middle Weight

AC. Remnant, Digby, received a "walk over," AC. Wiles, of Eastchurch, being disqualified.

Junior Light Heavy

AC. Thomas, Sealand, outpointed AC. Smith, Old Sarum.

Junior Heavy Weight

AC. Lambert, Felixstowe, beat Cpl. Hawkins, Old Sarum, on points.

Officers' Feather Weight

P/O. Bowman, Henlow, gained a points verdict over F/O. Stroud, Upper Heyford.

Officers' Light Weight

P/O. Sisson, Grantham, beat P/O. Collins, Upavon, in a good fight.

Officers' Welter Weight

F/O. Gore, Duxford, outpointed P/O. Moorby, Upavon.

Officers' Middle Weight

F/O. Bufton, Henlow, beat F/O. Streatfield, Upavon.

Officers' Light Heavy Weight

P/O. O'Hagan, Upper Heyford, outpointed F/O. Delap, Henlow.

Officers' Heavy Weights

F/O. Gillan, Halton, gained an easy points verdict over F/O. Matson, Duxford.

Airmen Senior Fly Weight

AA. Purdie, Halton "B," outpointed AC. Totton, Uxbridge.

Senior Bantam Weight

AA. Cooper, Halton "A," beat AC. Stevenson, Andover, on points.

Senior Feather Weight

AC. Blackburn, Henlow, outboxed AC. Watson, Halton, "B," for a points verdict.

Senior Light Weight

AC. Ward, Andover, knocked out L.A.A. Watkins, Halton "A," in the 3rd round.

Senior Welter Weight

AC. Williams, Grantham, beat AC. Cruise, Cranwell, on points.

Senior Middle Weight

L.A.A. Croce, Halton "A," outpointed AC. Jones, Cranwell.

Senior Light Heavy Weight

AC. Wilby, Uxbridge, knocked out AA. Wright, Halton "A," in the 1st round.

Senior Heavy Weight

AA. Tubbs, Halton "B," beat AC. Bingham, Uxbridge, on points.

The team results were as follows:—

Officers—					
Henlow	..	..	..	21 points.	
Duxford	..	..	..	18 points. (Runners up.)	
Airmen, Senior—					
Halton "A"	..	..	..	32 points.	
Halton "B"	..	..	..	25 points.	
Henlow	..	..	..	25 points. (Runners up.)	
Airmen, Junior—					
Sealand	..	..	..	35 points.	
Felixstowe	..	..	..	33 points. (Runners up.)	

The trophies and medals were presented by Major-General Sir Percy Cox, late High Commissioner for Iraq, who said that he appreciated tremendously the honour of so doing, and the kindness of those who invited him to see the delightful boxing which had just taken place. Although he feared he was becoming a "hardy annual" at these competitions, it gave him great pleasure to meet again the many friends he had known in Mesopotamia and elsewhere, and he was very grateful that he was again invited.

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The Indian Air Force

SQD. LDR. E. L. ARDLEY has been posted for special duty with the embryo Indian Air Force. For the past two years he has been on the staff at R.A.F. H.Q. in India.

Proposed Memorial at Beauvais

AN Anglo-British committee is being formed to consider the erection of a French memorial at the spot near Beauvais where the airship R.101 was destroyed. It has been stated that the British representatives will be Sir Fabian Ware, Vice-Chairman of the Imperial War Graves Commission, and Sir Henry McAnally, who retired recently from the Air Ministry.

IMPORTS AND EXPORTS

AEROPLANES, airships, balloons and parts thereof (not shown separately before 1910).

For 1910 and 1911 figures see FLIGHT for January 25, 1912.

For 1912 and 1913, see FLIGHT for January 17, 1914.

For 1914, see FLIGHT for January 15, 1915, and so on yearly, the figures for 1930 being given in FLIGHT, January 16, 1931.

	Imports.	Exports.	Re-exports.			
	1930.	1931.	1930.	1931.	1930.	1931.
Jan.	£ 2,987	7,965	£ 147,935	£ 142,596	—	£ 1,074
Feb.	2,460	3,303	226,049	110,587	1,000	1,293
Mar.	744	5,615	156,098	83,088	802	3,441
April	2,959	2,216	213,390	213,401	79	530
May	11,706	1,964	158,460	275,382	2,550	198
June	15,029	6,780	252,443	78,298	1,060	361
July	14,216	1,790	170,594	177,006	938	131
Aug.	5,382	3,556	146,564	153,834	6,912	2,316
Sept.	2,757	1,088	109,363	218,987	1,730	1,074
Oct.	3,502	1,863	140,235	124,810	355	4,505
Nov.	13,849	3,097	162,116	124,374	1,000	1,004
	75,591	39,237	1,883,237	1,702,363	16,426	15,927

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PUBLICATIONS RECEIVED

The Royal Air Force Quarterly. October, 1931. Vol. 2, No. 4. Aldershot: Gale & Polden, Ltd. Price 5s. net.

Achievements of 1931 on Castrol. C. C. Wakefield & Co., Ltd., Wakefield House, Cheapside, London, E.C.2.

Lloyd's Register of Shipping: Annual Report, 1930-31. Lloyd's Register of Shipping, 71, Fenchurch Street, London, E.C.3.

Aeronautical Research Committee Reports and Memoranda: No. 1397 (Ae. 518—T. 3057). Airscrews at Negative Torque. By C. N. H. Lock and H. Bateman. January, 1931. Price 6d. net. No. 1398 (Ae. 519—T. 3068). *A Method of Testing the Strength of Aircraft Hulls.* By I. J. Gerard. November, 1930. Price 1s. 3d. net. London: H.M. Stationery Office, W.C.2.

Robert Bosch and His Work.—Issued by C. Matschoss, at the instance of the Association of German Engineers. VDI-Verlag, Berlin, N.W.7. Price RM. 8.

High-Speed Diesel Engines.—Wm. Beardmore & Co. Ltd., Parkhead, Glasgow.

Report on the Health of the Royal Air Force for the Year 1930.—London: H.M. Stationery Office, W.C.2. Price 1s. 3d. net.

Aeronautical Research Committee Reports and Memoranda: No. 1388 (Ae. 510—T. 2956). Velocity in a Wind Channel Throat. By T. E. Stanton. May, 1930. Price 4d. net. No. 1399 (Ae. 520—T. 3090). *Range of Aircraft with Air-Cooled Radial Engine Using Altitude Control.* By A. E. Woodward Nutt, Flt. Lt. A. F. Scroggs and E. Finn. November, 1930. Price 9d. net. No. 1406 (Ae. 527—T. 2980). *Take-off and Landing of Aircraft.* By D. Rolinson. June, 1931. Price 1s. 9d. net. H.M. Stationery Office, London, W.C.2.

A History of Aircraft.—By F. A. Magoun and E. Hodgins. London: McGraw-Hill Publishing Co., Ltd. Price 21s. net.

The "Bluebird's" Flight. By the Hon. Mrs. Victor Bruce. London: Chapman & Hall, Ltd. Price 21s. net.

FLIGHT, The Aircraft Engineer and Airships.

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